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UNION OF SOUTH AFRICA.

DEPARTMENT OF AGRICULTURE.

REPORT

WITH

APPENDICES

FOR THE

YEAR ENDED 31st MARCH, 1916.

(EXCLUSIVE OF THE SECTION RELATING TO AGRICULTURAL EDUCATION.)

Presented to both Houses of Parliament by Command of His Excellency the Governor-General.

Price 3s. 6d.

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1917.

[U.G. 25—'17.]

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WITH

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FOR THE

YEAR ENDED 31st MARCH, 1916.

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DEPARTMENT OF AGRICULTURE.

REPORT FOR THE YEAR ENDED 31ST MARCH, 1916.

(Excluding Agricultural Education.)

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UNION OF SOUTH AFRICA.

ANNUAL REPORT of the Department of Agriculture for the Year ended 31st March, 1916, with Appendices.

Presented to both Houses of Parliament by Command of His Excellency the Governor-General.

ANNUAL REPORT, 1915-16.

MINISTER OF AGRICULTURE.

I have the honour to submit my report on the work of the Department of Agriculture, Vote 32, for the year ending 31st March, 1916; the report on Vote 33 will be presented under another cover.

Last year the Government decided not to print any departmental reports; the reports of the Divisions were prepared as usual, however, and typed copies filed for reference, and a short report written by Mr. du Toit, Under Secretary, during my absence on leave, was "roneoed" and circulated to a limited extent.

This year it was decided to publish the report as usual, but in as brief a form as possible.

During the year under review practically no changes were made in the policy or organisation of the Department, with the exception of the closing of four sub-experiment stations, the reasons for which will be discussed later.

The arrangement of the Department in the manner decided upon at Union was nearly completed last year, and would have been entirely so by now, but for the war and rebellion which have had the effect of hanging up many matters for the time being.

The outlines of reorganisation such as the organisation of the different divisions and the fixing up of the scientific and technical work of the Department did not present many difficulties, and were soon carried out, but the arrangement of the administrative and clerical establishment and of certain details occupied more time, and could only be effected gradually as the ultimate requirements of the Department became apparent and opportunity offered.

Nearly the whole of the vast amount of clerical and accounting work involved in taking over the work of the four Colonial Departments and of establishing the existing Department has now been cleared off.

The greater portion of the legislation needed to co-ordinate the laws and regulations in force in the various Provinces and bringing about uniformity of action throughout the Union has been passed, and certain lines of work undertaken by one or other of the Colonial Departments that seemed to be unnecessary under existing circumstances, or to belong to some other Department have been discontinued or transferred, and the Department left free to concentrate its attention upon its legitimate functions.

The Land Bank formed for the Union on the lines of the Transvaal Bank has relieved the Department of a great amount of delicate and worrying work previously undertaken by the Cape, Natal and Orange River Colony Departments in connection with advances to farmers for various purposes and the recovery of the same. Experience shows that the granting of loans to farmers has often not been very wisely or properly conducted, and the existence of an institution like the Land Bank which deals with the matter on business principles, and is as independent of political influence as it is possible for a State institution to be, is a great help and safeguard, and it is sincerely to be hoped that the practice of making all advances to farmers through it will be continued.

The Schools of Agriculture and Experiment Stations are relieving the Head Office of a great deal of work; they are visited and consulted freely by the farmers, and owing to their situation and the knowledge they possess of local conditions they are able to advise farmers, and to render many services to them more promptly and satisfactorily than Head Office could. For the same reasons, and through being able to make observations and experiments on large farms conducted in a practical manner they are favourably situated for ascertaining the needs of the farmers in their areas, and for devising methods of assisting them.

Co-ordination of work between the various Divisions of the Department and the Schools and Experiment Stations is arranged through the Secretary's office, and the office of the

Under-Secretary in charge of Agricultural Education provides for unity of action and co-operation amongst the Institutions themselves.*

Heads of Divisions are encouraged to deal direct, when possible, with correspondence relating to their divisions, or, if the replies require the secretary's signature, to draft them for him; in this way papers are dealt with by those most competent to handle them, delays are avoided, and clerical work reduced to a minimum.

As far as can be seen no further changes in the organisation of the Department, which is similar to that adopted in most progressive countries, are likely to be required at present, though with such a diversified and variable subject as agriculture it would not be wise to dogmatise on that point; it may safely be asserted, however, that should any occur, they will be in the nature of extensions rather than contractions.

In response to the urgent requests of the Government the expenditure of the Department has been kept within the narrowest possible limits, and although it cannot be said that the work in progress has suffered, for despite the economies that have been effected the scientific and technical staffs of the two votes are larger now than they were at Union, and much better equipped, yet it is sincerely to be hoped our vote will be increased at the earliest possible opportunity, as there is a vast amount of work of the greatest importance to the country crying aloud for attention. The greatest needs are research and education. New laboratories and an increase of staff are required by the Division of Chemistry. The Division of Entomology should be housed near the Union Buildings, and the Division of Botany also needs more accommodation and an increased staff. More veterinary surgeons are urgently required. The journal and other publications should be resumed, and co-operation ought to be preached more extensively. Itinerant instruction, which will mainly be provided by the Schools is greatly needed in the country districts.

STAFF.

For the size of the Department there were few changes in the staff. I regret to have to report the deaths of Doctor J. Medley Wood, the Curator of the Herbarium at Durban—a distinguished botanist—and also of Government Veterinary Surgeon Pakeman, and Senior Sheep Inspectors C. A. Wilson and P. J. de Wet, and Sheep Inspectors H. J. Granger and B. Graham, all of whom rendered good services to the country, and will be greatly missed.

J. M. Christy, Senior Veterinary Officer, Transvaal, who also served the Department well, retired on account of ill-health, and 28 Sheep Inspectors retired on attaining the age limit.

Two Senior Sheep Inspectors, L. Badenhorst and C. Brits were transferred to Defence, and 44 officers, including Mr. Enslin, Chief of the Division of Sheep and Wool; Mr. Vipond, Chief Chemist, Mr. Williams, Chief Clerk, Mr. Mogg, Assistant Botanist; and Messrs. Dewey and Gow, of the Dairy Division, are on active service in East Africa or elsewhere.

Mr. Collie, Deputy Accounting Officer, was loaned to the South-West African Protectorate, and 27 officers, including 8 Veterinary Surgeons, were lent to Defence.

Mr. B. J. Brummer, a returned scholar, was appointed Government Veterinary Surgeon, and Messrs. A. C. Lyell and H. Minnaar Inspectors of Co-operative Societies.

121 Temporary officers were appointed for the locust campaign.

The following senior officers were away on leave for a portion of the year—Messrs. C. P. Lounsbury, C. Fuller, and the writer.

Whilst in England I discussed many matters relating to the Department with the High Commissioner and the Trades Commissioner and the Board of Agriculture, the Board of Trade, and other Government Offices and the Imperial Institute. I also visited the Smithfield, Covent Garden, Mark Lane and Coleman Street Markets, to inspect our meat and fruit there, and inquire into the grain and wool trade. I purchased and shipped some livestock for the Department, and engaged a Lecturer in Dairying for Grootfontein, and endeavoured to obtain some veterinary research officers for Onderstepoort, in the last of which unfortunately I was unsuccessful; I also visited Experiment Stations and Agricultural Colleges at Rothamsted, Oxford, Cambridge, Weybridge (Board of Agriculture, (Veterinary Research), Wisley (Royal Horticultural), and Wimbleton (John Innes) and the Dairy and Smithfield Shows, and many farms and herds of livestock.

Mr. Lounsbury occupied his leave in visiting Australia, Canada and U.S.A., to investigate entomological matters in those countries.

Students.—The practice of sending young men from this country to qualify for the professional staff of the Department is proving most useful. 66 Scholarships have been granted since the system was inaugurated shortly before Union, mostly for 3 or 4 years, and 37 students have returned, of whom 31 are in the Department at present, and 23 are still studying.

ACCOUNTS.

	1914-15.		1915-16.	
	Expenditure.	Revenue.	Expenditure.	Revenue.
	£	£	£	£
Administrative and General	41,088	9	32,552	195
Veterinary	91,522	3,721	79,665	684
Sheep Division	125,509	55	139,539	133
Veterinary Research	43,837	12,706	39,687	18,984
Dairy Industry	4,498	99	3,967	—
Botany	6,322	—	6,995	—
Tobacco and Cotton	10,378	861	9,185	1,591
Horticulture	3,100	696	3,207	1,054
Viticulture	3,160	1,771	2,566	1,538
Entomology	11,269	1,054	20,915	760
Chemical Laboratory	2,083	—	1,653	39
Publications and Library	3,183	—	2,294	—
Co-operation	3,038	—	2,618	—
Dry-Land Farming	4,748	153	3,690	410
Guano Islands	30,555	34,567	31,681	73,643
Grain Inspection	2,264	2,981	2,731	5,057
Field Cornets	8,079	—	—	—
Miscellaneous	—	3,443	—	2,191
	£394,633	£62,116	£382,945	£106,279

During the ten months after Union, the first financial period, the expenditure of the Department, which at that time had not been reorganized, and consisted of the four Colonial Departments grouped together, was at the rate of £727,412 per annum, and for the following year, 1911-12, it was £735,549; from that time onwards it has been steadily reduced to its present dimensions. This has been effected by the discontinuance of services which the Department was not warranted in continuing, and in the transfer of others to other Departments more directly concerned with them, and by economies connected with East Coast Fever, rendered possible by change of policy in dealing with the disease and its abatement in Transvaal, and by general economies in the working of the Department. The reductions have been accomplished without any diminution of the legitimate work of the Department or any decrease in what may be termed the professional staff, which, as a matter of fact, is slightly larger now than it was at Union.

A few small economies may still be effected when things have settled down again after the war, but beyond them there appears to be no possibility of further reductions in the near future, without the work of the Department suffering, whilst on the other hand, as already pointed out, there is great need of expansion in many directions.

The two great items of expenditure are Scab and East Coast Fever, which amount to more than half the total cost of the Department, and nearly double the expenditure on agricultural education; it is sad to think that such vast sums of money should have to be spent annually by the Department, and still greater amounts lost by the farmers each year on diseases that could easily be eradicated in a short time if only owners of livestock would pay more attention to their animals and co-operate with the Department in the campaign against the pests.

SUB-EXPERIMENT STATIONS.

Since the last report the Dry-land sub-experiment stations at Pretoria, Vryburg and Warm Baths, and the Tobacco and Citrus station at Tzaneen have been closed; the last-named, which was really a considerable estate, and only partially used by the Department, was transferred to the Land Department for settlement purposes, for which it was originally purchased, and is well adapted, as the soil is fertile, and it is well watered, and there is now a railway station on it.

Sub-experiment stations have proved very expensive to establish and maintain as, owing to the regulations and restrictions imposed by Government, it is impossible to run them on anything approaching business lines; the capital outlay on buildings, water supplies, and so forth, usually amounting to several thousands, and the maintenance of the simplest stations, amounting to nearly £1,000 per annum, and in some cases more.

The stations, which were only moderately visited by the public, were not in charge of scientific officers, and were mainly concerned with cultural, manurial and variety tests of a simple character, and it was thought this work did not justify the outlay involved, and that if the money were devoted to itinerant instructions and to conducting experiments on private farms in different parts of the country more people would be appealed to, and the experiments themselves would be more useful and convincing as, after all, the final test of any variety of crop, manure or method of cultivation is on the individual farm.

For the investigation of certain diseases and other scientific problems occurring in particular areas, as well as for the acquiring of information that cannot be obtained otherwise, sub-stations such as there is at Armoedsvlakte may be essential, but in such cases they should be confined to the particular problems to be solved, and be of as simple and inexpensive a character as possible.

VETERINARY DIVISION.

The Division has been seriously handicapped by the absence of about half of its professional staff, and a number of its Stock Inspectors on active service in East Africa and elsewhere. Fortunately, despite the shortage of staff and the confusion caused by the rebellion, and the extensive collecting together and movements of equines by the Defence Department all conditions favourable to the spread of disease—there has been no serious extension of disease of any kind, with the exception of Anthrax and of East Coast Fever in certain areas, neither of which could be attributed to the conditions referred to.

That the country has escaped so lightly from what was really a grave danger is a matter for congratulation, and the Principal Veterinary Surgeon and his staff are to be commended for the way they have managed during a very trying time.

Requests are continually being received from farmers for the services of Veterinary Surgeons, which is an excellent sign, as it indicates that farmers are paying attention to the welfare of their animals. The need for more veterinary assistance, both in connection with contagious diseases and other ailments of stock, is great and urgent, and should be met as soon as possible.

The number of Veterinary Surgeons in the Division should be increased, and the advisability of giving grants to Veterinary Surgeons in private practice in country districts in the same manner as to District Medical officers should also be considered. To help to meet the demand for Veterinary Surgeons it has been the policy of the Department to give scholarships to young men to qualify as such; several scholars have already returned from abroad, and a number are pursuing their studies. A few young men have also on their own account gone abroad to qualify as Veterinary Surgeons. Until quite recently young Africanders—closely associated with livestock as the majority of them were—took little interest in Veterinary science, and the disposition to do so now is very welcome and indicative of the different light in which stock farming is being viewed.

The position as regards disease is described in detail in the Principal Veterinary Surgeon's report; on the whole it is favourable, and though there is still a great deal to be done, and the loss of stock from disease is far greater than it ought to be, it is evident progress is being made, and that conditions are very different now to what they were a few years ago.

East Coast Fever bids fair to be entirely eradicated in the Cape Province proper in the near future. When the disease first appeared there it was feared it would extend over a large area, as the outbreak occurred in a section of the country difficult to work, and largely inhabited by natives. Fortunately the reverse has occurred, and the way the disease has been dealt with reflects great credit on the Veterinary staff and on Mr. Gilfillan, Resident Magistrate, who was delegated by the Department of Native Affairs to explain matters to the natives and to deal with them.

In the Transkei an improvement is reported in the areas occupied by Europeans, but not much in the Native areas, which, owing to lack of fences and other reasons, are most difficult to control.

In the Transvaal there has been a slight, and in Natal a considerable recrudescence of the disease, which is disappointing, though there is no ground for alarm. As far as can be gathered it is due to carelessness in dipping, and to neglect to report deaths of cattle, and in some cases it is feared to wilful concealment of the existence of the disease.

There has been a considerable increase in outbreaks of Anthrax in the Transvaal and Cape Provinces, which is very disquieting, as though in some respects the disease is easy to deal with, in others it is very difficult, and it is also dangerous to human beings.

No changes have been made in the policy with regard to Tuberculosis in cattle, though there is an increasing disposition amongst owners of pure bred cattle to have their animals tested. Out of 234 head of cattle imported from oversea, which passed the test for Tuberculosis before shipment, 17 or 7·2 per cent. re-acted when tested here.

At the urgent request of the Agricultural Union and the Breed Societies, the Stock Diseases Act was amended to allow of the admission of cattle into this country without being tested for tuberculosis after arrival, provided they had been tested in the country of origin immediately before shipment at a Government station in a manner approved by the Minister. If this Act proves successful it will be a great relief to the Department and to importers, but that experience alone can determine.

Other scheduled contagious diseases were not much in evidence, and, speaking generally, the situation in respect of them is satisfactory.

Owing probably to climatic conditions non-scheduled epizootic diseases, such as horse sickness, blue tongue, etc., which constitute one of the great handicaps to stock farming in South Africa, were not so prevalent as usual.

DIVISION OF SHEEP AND WOOL.

This Division, like many others, has been considerably handicapped by the absence of a number of its staff, including the Chief, on military duties.

Owing to greater care in selection, better training and closer supervision, the standard of the Sheep Inspectors is improving, and it is pleasing to be able to report that the majority of them are taking a keen interest in their work. The areas of many of them are too large however for one man to do justice to, and it is essential that the number of Inspectors should be slightly increased so that the size of some of the areas can be reduced.

The amended regulations introduced in 1914 are working well; experience has revealed the necessity for a few slight alterations, but on the whole they constitute the most effective weapon for fighting scab yet forged in South Africa.

The Sheep and Wool Experts have been fully occupied in classing flocks, establishing studs, selecting rams, inspecting sheep for the Stud Book, lecturing, demonstrating, judging at Shows, and generally in advising and assisting farmers with their sheep and wool. Last year they handled some 379,000 sheep, and delivered 346 lectures and demonstrations. Their services were greatly appreciated and much in request, and there is little doubt they have materially assisted in bringing about the great improvement in the quality of our sheep and wool, and the preparation of the latter for market that has recently taken place.

The number of woolled sheep in the Union at the 31st December, 1915, was 25,943,806, as compared with 28,327,907 two years previously. Owing to the rebellion a census at the end of 1914 was not possible. The number of Angora goats at the 31st December, 1915, was 2,844,505, and at the same date in 1913 it was 4,194,884. Non-woolled sheep also decreased in the two years, from 7,840,093 to 5,490,274, and common goats from 7,211,142 to 6,073,767. The total reduction in sheep and goats in the two years was from 47,214,026 to 40,352,351. The drought in 1915 alone accounted for nearly 3,000,000, of which 2,500,000 were lost in the Cape Province.

The actual loss is enhanced by the fact that wool and mohair are realising exceptionally high prices. Superior greasy wool fetched, at the end of the year under review, from 1s. 1d. to 1s. 6½d. per lb., average good greasy wool from 10d. to 1s. 3d., and inferior greasy from 7d. to 11d. Mohair realised at the same time from 14d. to 18½d. per lb., with a strong tendency to rise.

During the rebellion control of movements of infected stock was impossible over a large part of the Union, and scab increased very considerably. At the end of 1914 it was impossible to collect statistics in regard to the number of flocks and sheep infected, but it is certain that the position greatly improved during the following year (when more or less normal conditions were again reached), although not so much as to afford a favourable comparison with the year 1913. The percentage of infected flocks at the end of 1915 was 1·43, and at the end of 1913 it was 0·99, the percentage of infected sheep and goats being respectively 2·37 and 1·54.

The set back is regrettable, but there are good reasons for believing not only that it will soon be overcome, but that we are on the eve of considerable progress in the campaign against scab. The Division is in a better position both as regards staff and legal powers for fighting the disease than it has yet been, and owing to the erection of dipping tanks, which is now enforceable by law, and the extension of fencing, farmers are better able to cleanse their flocks or prevent them from getting the disease, as the case may be, than they were. The extension of railways and the consequent reduction in trekking is another factor; further, and best of all, the spirit of progress is abroad, and farmers are taking a greater and more intelligent interest in their sheep and wool. But though a marked improvement may be hoped for, particularly in the best sheep districts, it would be too much to expect that scab will soon be eradicated, for there are few, if any, countries in the world in which the disease is more difficult to cope with than this. The vastness of the country renders supervision and control very arduous and expensive. The scarcity of water in parts even for dipping, and the liability to droughts, which when they occur, necessitate the trekking of sheep on a large scale are serious obstacles, and so is the custom of kraaling sheep at night for lack of fencing, or for protection against jackals. The presence of such large numbers of non-woolled sheep and goats that harbour scab, and yet not so much affected in value by it as woolled sheep are, constitute another obstacle, as their owners, who are frequently the more backward type of farmers have not the same incentive to clean them as owners of woolled sheep have to clean theirs. Last, but not least, there is the large number of natives scattered throughout the country who almost invariably have a few non-woolled sheep and goats grazing around their kraals, and complicate matters considerably.

DIVISION OF VETERINARY RESEARCH.

As usual this Division has been very fully occupied, and has accomplished an enormous amount of work.

At the present time there are three laboratories—Onderstepoort, Grahamstown and Allerton—and two Field Stations, Armoedsvlakte, near Vryburg, and Besters Put, in the Orange Free State, for the study of Gallamziekte, and the staff consists of a Director, 8

Veterinary Research Officers, a Physiological Chemist, an Entomologist, 18 lay assistants, and a number of clerical assistants, foremen, labourers, etc.

The total expenditure on the Division during the year amounted to £39,330, and the receipts to £18,984. Despite these provisions the work imposed upon the station, both research and routine, is so great that further extension of staff and accommodation are constantly needed in order to cope with it.

Owing to the war, the obtaining of assistants for the staff possessing the necessary scientific training and the ability and instinct for conducting research—always a difficult matter—has become intensified.

At the present time negotiations are being conducted with a Veterinary scientist of the highest qualifications, who it is hoped will accept the post of Assistant Director, and there is also a possibility of another old and valued member of the staff rejoining it, and there are two or three students now studying abroad, who it is expected will prove useful recruits.

The three chief subjects of research were Gallamziekte in cattle, Horse-sickness, and Wireworm in sheep. The theory propounded by Professor Hedinger, the distinguished Veterinary Pathologist, who visited the country in 1914, to give us the benefit of his views on the disease, that Sarcosporidia were the cause of it, was thoroughly investigated, the evidence going to show that Sarcosporidia are not responsible for the disease.

As the result of this and other investigations, Sir A. Theiler is of opinion that the grass toxin theory which he originally advanced offers a better explanation of the cause of Lamziekte than any other, and he is using it as a base for further research, which is being inaugurated on an extensive scale. In addition to enquiries into the cause and nature of the disease, efforts have been made to discover a preventative or cure for it, and a great variety of substances and treatments have been tried, but so far unfortunately without success.

Horse-sickness.—The work in connection with this disease is progressing favourably, and though the experiments are not complete, it appears that at last a method has been discovered which will convey a high degree of immunity, and can be performed with small loss. Experiments were also undertaken to ascertain whether horses could be protected from horse-sickness by dipping.

The life history of the *Wireworm* occurring in sheep was investigated further with interesting results, a full account of which will be published in the 3rd and 4th Scientific reports of the Division.

An enquiry into Trypanosomiasis in Zululand, where the Tsetse fly disease is causing considerable loss, was conducted by Mr. Mitchell, who came to the conclusion that wandering game are responsible for the primary outbreak of the disease, and that Tsetse flies will not travel from the original fly belt unless cover is continuous, or in company with game, also that in the absence of tsetse it is unlikely that outbreaks of Nagana would originate from recovered or partly recovered cattle or from game localised on the cattle grazing area.

Attention was also given to the following diseases, all of which are of importance to the country, and require further study, Imapunga, Contagious Abortion and Stijfziekte in cattle, Pernicious anemia, Jachtziekte and Dunsickness in horses, Gouw-ziekte, and Geeldikkop in sheep, Rickets in donkeys and sheep, and the Spinose ear tick.

The amount of routine work undertaken by the Division was very large, as the following figures testify, and it is continually growing:—

15,030 specimens and smears were examined at the three Laboratories, and the following dosis of vaccines were issued:—

Bluetongue, 1,971,180; Redwater and Gall sickness, 11,312; Anthrax, 260,700, which included 150,000 manufactured by the Division.

Previous to this year Anthrax vaccine was imported, but in future it will be made by the Division.

1,091 mules were inoculated for horse-sickness, with a mortality of 1·8 per cent., which is very satisfactory.

1,180 agglutination tests were made for contagious abortion in cattle—a new test conducted for the first time.

25,546 letters and telegrams were received, and 22,717 despatched.

DIVISION OF DAIRYING.

During the 4 years, 1912-1915, the production of Butter and Cheese (as nearly as can be ascertained), and the imports of Butter, Cheese and Butter Substitutes were as follows:—

		1912.	1913.	1914.	1915.
Production :					
Butter	lbs.	10,441,000	10,741,000	10,682,000	13,407,140
Cheese	,,	not available	520,849	605,686	1,098,784
Imports :					
Butter	,,	4,925,188	3,893,036	3,919,431	2,026,258
Cheese	,,	5,165,715	5,586,244	5,225,283	3,966,269
Butter Substitutes	,,	1,707,635	1,989,486	1,772,630	2,095,329

There are now 52 creameries, 70 cheese factories and about 97 cheeseries in the Union. The production of both butter and cheese is making satisfactory progress, and the increasing output points to rapid development of the dairy industry, and the near approach of an export trade. Small test shipments have established the fact that our creamery butter will be favourably received on the English market when an export trade commences.

The development of dairying is very gratifying, as no style of farming is more suited to small farmers than it, or better calculated to promote thrift and intensive cultivation. The production and handling of milk and the conversion of it into butter and cheese require great skill and cleanliness, and the experience of every country in the world in which dairying has become a feature, has demonstrated the necessity of education and supervision by the State; in this country where owing to the temperature, dust and other natural causes, as well as the backwardness and total inexperience of many of the farmers, the difficulties are greater than in most, the need is particularly urgent. Further, in order to ensure production on the best modern lines and to give confidence to buyers oversea, and place the industry on a sound footing, legislation dealing with the production and handling of milk, the management of creameries, and the inspection of dairy produce before export, is absolutely necessary.

Very high prices, ranging from 1s. 1d. to 1s. 10d. per lb. were paid for butter fat during the past season. This may be regarded as exceptional and due entirely to abnormal trade conditions, and when the war is over, we shall have to calculate on getting much the same for our butter fat as realized in other exporting countries.

More instruction in the making of cheese, which is rapidly becoming an important industry and is more frequently performed at individual farms and small centres, than butter making, is, according to Mr. Challis, particularly desirable, as also is the grading of cheese before sale in order to prevent the producers and the industry generally being discredited by the placing of inferior cheese on the market, which is often done through ignorance as well as carelessness. Mr. Challis states that though cheese making is particularly suited to women, and they usually make the best cheese, few take it up in this country.

Division of Botany.

After the death of Doctor Medley Wood, the Director of the Natal Herbarium, which is referred to elsewhere, the house he occupied adjoining the Herbarium was converted into a laboratory for the investigation of diseases of tropical and sub-tropical crops, and Doctor van der Bijl, from the Pretoria laboratories, was placed in charge of it and of the Herbarium.

The Herbarium in Pretoria which was formerly housed in the old Botanical Laboratories in Wessels Street, has been moved to a building erected alongside the present Botanical Laboratories; the arrangement is convenient, but more space is greatly needed.

Valuable presents of named and mounted plants were received from Mr. Max Happe, Miss Peglar, Archdeacon Rogers and others during the year.

A considerable proportion of the time of Mr. Pole Evans was occupied in the botanical investigation of Gallamziekte and Gouwziekte areas at Vryburg and elsewhere, in conjunction with the Director of Veterinary Research.

The investigations into Rooibloem or Witchweed were continued but so far no practical method of dealing with the pest has been discovered.

The Kikuyu grass obtained from British East Africa some years ago continues to do well and is worth a trial in parts of the Union likely to suit it.

A great deal of routine and research work was performed in connection with Plant Pathology. This portion of the work of the Division is much handicapped by the lack of greenhouses which are essential for the investigation of many pathological and physiological problems.

In 1914 a disease affecting citrus fruit was discovered in the Drakenstein Valley near Paarl and has since been found in a number of other places in the South West Districts of the Cape Province. As precautionary measures, until it could be studied, infected nurseries were quarantined as far as citrus trees were concerned, and citrus growers in the infected area were advised to pay particular attention to the collection and destruction of fallen and diseased fruit and to spray with Bordeaux Mixture. Meanwhile the disease is being investigated by Doctor Doidge, who has ascertained that it is due to an undetermined bacterial organism. As the investigations progress, action will be taken to deal with the disease in the light of the same.

At the present time the staff of the Division consists of the Chief, 2 Botanists, 3 Mycologists, 3 Herbarium Assistants, 3 Lay Assistants, 3 Clerks and a Foreman.

A good deal of botanical work is also undertaken at the Schools of Agriculture and Experimental Stations, but despite these provisions the Department is unable to deal with many matters urgently needing attention and in the interests of the country it is imperative that the facilities for botanical research both in the Division and at the Schools should be extended as soon as circumstances permit.

DIVISION OF TOBACCO AND COTTON.

The work of this Division proceeded much as usual during the year.

Experiments in tobacco and cotton, such as breeding new varieties, the use of fertilisers, methods of cultivation and the curing of tobacco were continued at the Experiment Stations at Rustenburg, Tzaneen, Piet Retief and Elsenburg. It has been decided to transfer the Tzaneen Estate, which has been controlled by this Department since Union, to the Department of Lands for settlement purposes, and steps to this end are in progress. A statement showing the area under experimental crops and the yields will be found in Appendix VIII. In addition to the work at the Stations four field officers located in the Provinces devoted a large amount of attention to individual farmers by visiting them and giving advice, and lecturing at farmers' meetings. Useful work is done by these officers in bringing to the notice of farmers the results obtained at the Experiment Stations and helping farmers to undertake simple experiments on their own farms, which after all is the best guide as to what crops or methods are likely to be successful on them.

There are no statistics available of the quantity of tobacco produced since 1911, but there is no reason to believe that the production has greatly increased since then. Successive years of drought in the Northern Provinces, the advent of cotton growing in the Rustenburg District with its greater certainty of yield, and drought in the principal tobacco growing districts of the Cape Province have affected the output. Consequently, as might be expected, prices were good, and both the tobacco warehouses at Rustenburg and Paarl had a successful year and disposed of all their stocks.

The production of seed cotton last year was about 500,000 lbs. The increasing production has encouraged the erection by private enterprise of a mill for converting the seed into the usual by-products oil, oil-cake and fertiliser—which will increase the return to the producer and further stimulate production. Prices range from 7d. to 7½d. per lb. f.o.r. Rustenburg which is the chief producing centre at present.

After many experiments by the various Colonial Governments and latterly by this Department, and much pioneer work, the cultivation of cotton in certain parts of the Union seems to be in a fair way of becoming established. Should it prove to be so, the country will benefit enormously as the crop is a good drought resister and will furnish a useful additional crop in areas where the range of crops is at present somewhat limited. Further, it is adapted for small as well as large farmers and provides work suitable for native women and children, and, therefore, should help to develop another of our assets.

The seed is highly nitrogenous and furnishes a type of cattle food that is greatly needed in this country to mix with mealies for feeding to milch cows and fattening cattle. Like that of many of our other districts, the quality of the cotton is excellent and it usually realises from ½d. to 1d. per lb. more in England than does the same variety from elsewhere.

DIVISION OF HORTICULTURE.

This Division has been busily engaged as usual in advising fruit growers, grading fruit for export, and generally assisting the industry, and the services of its officers have been much in request.

The fruit industry has suffered severely through lack of freight caused by the war, but confidence in the future of it continues as is indicated by the number of trees, especially citrus, which have been planted out in recent years. A detailed return has been presented to Parliament of trees in the fruit exporting districts. According to this return (and additions thereto since received), the number of fruit trees already planted that will come into bearing during the next 8 years is as follows:—

AGES OF NON-BEARING FRUIT TREES GROWN IN FRUIT EXPORTING DISTRICTS FOR THE PURPOSE OF EXPORTING FRUIT.

Kind of Tree.	Coming into bearing during the Season								TOTAL.
	1916-17.	1917-18.	1918-19.	1919-20.	1920-21.	1921-22.	1922-23.	1923-24.	
	No.	No.	No.	No.	No.	No.	No.	No.	No.
Apples	—	90	410	6,791	1,616	20,719	31,933	23,526	85,085
Apricots	—	—	—	—	—	2,706	11,802	13,529	28,037
Pears..	10	1,594	7,961	8,913	8,549	11,945	22,577	8,047	69,596
Peaches	—	—	—	—	—	17,287	19,628	16,371	53,286
Plums	—	—	—	—	—	12,645	13,257	12,613	38,515
Nectarines	—	—	—	—	—	2,116	2,766	1,063	5,945
Oranges (Seedling)	2,317	1,675	2,333	3,376	6,186	4,824	9,152	4,416	34,279
Oranges (Grafted)	—	—	—	60	13,867	42,703	50,871	126,290	233,791
Naartjes (Seedling) ..	16	1,660	1,571	498	633	1,054	1,113	86	6,631
Naartjes (Grafted)	—	—	—	—	377	1,930	1,094	1,114	4,515
Lemons	—	—	—	—	—	7,693	23,039	121,231	151,963
Mangoes	—	—	—	—	875	260	2,297	1,880	5,312
	2,343	5,019	12,275	19,638	32,103	125,882	189,529	330,166	716,955

This development makes the provision of greater cold storage accommodation on steamers sailing to Europe imperative and urgent. For some years the accommodation has been insufficient and representations to the Union Castle Steamship Company to that effect were made in 1914 and were favourably received; the European War, however, and the consequent requirements of the Admiralty have prevented anything tangible being done. It is hoped the matter will be remedied as soon as possible, however, as the knowledge that cold storage space is inadequate helps to check development.

The quantity exported in 1915-16 as compared with the previous year is as follows:—

Fruit.	Season 1915-16.	Season 1914-15.
Apricots	1,280 boxes.	1,803 boxes.
Peaches	26,193 ,,	42,869 ,,
Nectarines	6,062 ,,	7,532 ,,
Plums	30,910 ,,	27,130 ,,
Pears	56,722 ,,	94,951 ,,
Grapes	77,892 ,,	71,331 ,,
Mangoes	663 ,,	356 ,,
Apples	426 ,,	9 ,,
Melons	775 ,,	881 ,,
Oranges	38,681 cases.	43,565 cases.
Naartjes	14,692 trays and boxes.	25,370 trays and boxes.
Pineapples	1,653 cases.	3,541 cases.
Lemons	1,054 ,,	20 ,,
Grape Fruit	246 ,,	—
Sundries	65 ,,	471 ,,
	257,314 ,,	319,829 ,,

Abnormal prices ruled in the English market, due, chiefly it would seem, to the small quantity that could be accommodated on the steamers. Fortunately the Railway Administration extended their refrigerator truck service from the South-Western Districts of the Cape to the principal markets of the Union, which enabled much of the surplus fruit of exportable quality to be sold in this country at remunerative prices.

Enquiries are being made as to whether steamers will be available next season for direct shipments of fruit to the United States of America and to Canada.

The Annual Fruit Export Conferences were held at Cape Town and Durban for the purpose of obtaining the views of growers and shippers on the export of fruit.

In addition to the grading of fruit and the control of the export of it, itinerant instruction was given to many hundreds of farmers individually as well as demonstrations to groups of farmers in planting, pruning and general treatment, and in the packing of fruit.

There has been a considerable increase in the production of dried fruit and jam in the Western Province of the Cape, which is encouraging, as there is great scope for it and it is particularly helpful to small growers.

Reports from the Trades Commissioner on the shipments of deciduous and citrus fruit are included in the appendices to this report.

Division of Viticulture.

At the Paarl Viticultural Station there is now a collection of some 200 varieties of wine and table grapes, and experiments are made in the cultivation, manuring and management of grapes, wine making and testing of table grapes for export.

At Constantia a scheme for the training of poor white boys to become foremen on wine farms is under consideration.

The Oenological Institute has been completed. The building at Elsenburg is a two storey one and is designed in the Dutch style to harmonise with the rest of the College buildings; on the ground floor there is a Director's Office, library, chemical laboratories, balance room and lecture room, and on the first floor museum, bacteriological and pathological laboratories, yeast room, incubating room, sterilising and apparatus room; cellars and stores accommodation are provided in the basement. The laboratories and other rooms have been fitted up and equipped in a complete and up-to-date manner and a gas plant has been installed for the experimental work and lighting of the building.

We now possess all the equipment in the shape of the farm at Groot Constantia and the Experiment Stations at Elsenburg and Paarl necessary for conducting research, but the staff is still inadequate and will have to be considerably strengthened before sustained scientific investigation can be undertaken, and the problems affecting the wine industry investigated in the manner they ought to be.

The first course in wine-making was held in January, 1916, and was attended by thirty-eight farmers.

The Government Viticulturist gave six short-course lectures at the Institute and four lectures at meetings of farmers. He also paid 110 visits to farmers for the purpose of giving instruction on their farms.

During last season a number of varieties of table grapes new to this country were shipped to England and valuable information was obtained as to the suitability of these varieties for this country.

Owing to the desire of the Manager of Groot Constantia Wine Farm to retire from that position at an early date, it became necessary to effect a change in the management of the Estate. It was felt that the appointment, in the place of the present Manager, of some one who had not had the benefit of his experience would result in a break both in the methods of wine-making found successful on the farm and in the general conduct of the work, in a way that might lead to a set back, at least for a time. In order to avert this a contract was entered into with the present Manager to give part of his time to the work of the Estate so as to initiate the incoming Manager, who is one of the Viticultural students sent by the late Cape Government to study Viticulture in France, Germany and other European countries, and Algiers.

The vintage on this farm in 1916 was good as regards quality, although the yield was small, amounting to 9,899 gallons. The vintage for 1914 was 15,689 gallons, while that for 1915 was 9,485 gallons, the latter, from a quantity point of view, being the worst for many years.

While the wine-making industry may be said to be more or less stationary, the area under vines is increasing owing to the planting out of table grape varieties, for which the demand oversea is good, at prices which are very remunerative to growers. Given adequate cold storage accommodation on steamers this branch of the industry is likely to show considerable advancement in the near future.

The vintage of 1915 was a very small one and that of 1916, although of good quality, was not large and the price of wine in consequence is at present satisfactory to producers. The future of viticulture in this country lies in the creation of an export trade. The European War, with the consequent reduction in the production in France, has given an opening for South African wines for which enquiries are being made by English firms. It rests with Viticulturists to devise means for meeting this demand.

Division of Entomology.

During the year the Chief, Mr. Lounsbury, was absent for a considerable period on sick and vacation leave; the latter he devoted to visiting Australia, Canada and the United States of America in order to study the developments of economic Entomology in those countries.

In conjunction with the Natal Sugar Association, which is bearing the whole of the cost involved, a quarantine station for the isolation and inspection of new varieties of sugar cane imported into the country from oversea, has been established on the Durban town lands.

A number of investigations were undertaken by the Division, including the enquiry into bag-worm and other pests affecting wattles which is being conducted by Messrs. Hardenburg and Haines at the Field Experiment Station, New Hanover, Natal, which is now in its third year; studies of the scale insects of South Africa, termites or white ants, and the life cycles of several insects affecting field and garden crops.

Mr. Mally elaborated his method of destroying house flies by a bait composed of sweetened arsenic and applied it with great success in the hospitals and military camps in South West Africa and at the Elsenburg School of Agriculture and other places. The method is simple, inexpensive and effective, and should prove useful in places where these loathsome and dangerous insects are prevalent.

The most noteworthy work of the Division was the campaign against locusts in the Central and North Western portions of the Cape Province and the South West of the Orange Free State. For a number of years, thanks to the vigorous action taken by the Governments of the four Colonies at the time of the last infestation, and perhaps for other and more obscure reasons, the Union has been practically free from locusts, but in 1913 a recrudescence of the plague began in the development of numerous small swarms in a few of the midland districts of the Cape Province without any known migration of the insect into the area. It is thought that in the intervals between the cycles of its abundance the locust lives the life of an ordinary grasshopper, and that it only gathers into swarms and adopts a migratory existence when a succession of seasons favourable for its excessive multiplication occur. Whatever the explanation, it seems that the beginning of serious locust trouble is likely to coincide with a good season immediately following a series of exceptionally dry years during which the country was apparently free of swarms. Almost all the voetganger swarms of the 1913-14 Cape outbreak were destroyed by poison and it is thought the few that became winged were eradicated by migratory locust birds before there was time for them to lay eggs. Early in 1915 a few small swarms and myriads of scattered flyers came to notice in the southwestern quarter of the Orange Free State on the break-up of the drought which had prevailed there for years; and it was feared a serious outbreak was impending. Preparations were made accordingly. Circulars were issued to the press and to farmers in the areas likely to be infested, pointing out the danger that threatened and advising them what to do in the case of outbreaks occurring. Senior Locust officers were appointed for the areas in which it was thought locusts might be hatched, and motor car transport placed at their disposal; the good offices of the Magistrates and Police were solicited; and depots for the supply of poison and spray pumps were established so extensively in the infected areas that only in exceptional cases had farmers to send more than 15 miles for supplies, with the result that as soon as the locusts hatched out, which they did in considerable quantities, the majority were accounted for. In many places two generations were hatched.

The outbreak was worst over an area of about 20,000 square miles in the southwestern quarter of the Orange Free State and adjoining Cape Province districts, but it extended over the western half of the Orange Free State, the southwestern portion of Bechuanaland, much of Griqualand West, and Cape Province districts south of and inclusive of Victoria West. The swarms were poisoned on the lines adopted by the South African Locust Bureau, the working of which the Division took over after Union. In all 28,000 swarms were destroyed, and some 10,000 gallons of poison and 3,556 spray pumps were issued, and 114 temporary officers employed, the total cost of the campaign amounting to about £10,000.

Although we still have much to learn about the behaviour of locusts in this country, it seems evident that the generation of locusts on a large scale was commencing and it is possible that there may be small outbreaks for the next year or two, but there is every reason to hope that if the action taken last year is persisted in, the pest may be overcome and the country saved from what would under any circumstances be a dire calamity, and at a time like this, when foodstuffs are so scarce, almost an overwhelming one, for anything more unfortunate than a plague of locusts such as have occurred from time to time in South Africa and have devastated vast tracts of it for years in succession could not well be imagined.

The country is under a great debt of gratitude to the discoveries and elaborations of the methods of destruction now employed and to the wisdom and foresight of the founders of the Central Locust Bureau, and great credit is due to Mr. C. Fuller, who is acting Chief of the Division was responsible for the direction of the campaign in Mr. Lounsbury's absence, and to the locust officers, and indeed to all who were in any way concerned in it.

DIVISION OF CHEMISTRY.

The Chief of the Division, Mr. Vipond, is away on active service in Europe, and Doctor Marchand is acting in his stead.

The temporary wood and iron buildings in which the Division is housed, besides being inconveniently situated and otherwise unsuitable, are fast decaying, and it is imperative that other and better accommodation be provided for the Division at the earliest possible opportunity. The site originally proposed near to the Union Buildings is very suitable for the purpose as the laboratories would be in touch with the rest of the Department on the one hand, and if, as is hoped, the 50 acres of land known as "Prinshoff" are obtained for the purpose of a general experimental ground for the Department, with it on the other,—a highly desirable arrangement as facilities for outdoor work are essential to the full use of the Chemical Laboratory of an Agricultural Department.

The Division was mainly occupied with the analyses of soils, manures and feeding stuffs. Owing to the lack of facilities and the smallness of the staff, which it is useless to think of increasing under present conditions, little research was possible, which is to be deplored as there is a vast amount of chemical work of the greatest importance to farmers awaiting attention. Fortunately, the laboratories at the Schools and Experimental Stations are getting into shape and are doing a great deal of work locally, and so have relieved the situation somewhat, though they also need strengthening as there is more than enough work for all.

The Chemist reports that none of the soils analysed presented any very striking features, and that their general characteristics are poverty of lime and phosphates, and a sufficiency of potash in an available form.

A large number of samples of bat guano, a fertiliser that has been extensively advertised, were sent for analysis; the manure is very variable in composition, owing to the amount of sand or earth mixed with it, and usually of poor quality, and farmers should be careful to buy it only on analysis.

The samples of limestone submitted show that lime admirably adapted for agricultural purposes is available, though the price placed on it is usually high in proportion to its value to the farmers.

DIVISION OF PUBLICATIONS, AND LIBRARY.

Owing to the need for curtailing expenditure the publication of the journal was suspended in 1914 and the printing of bulletins and leaflets was reduced to a minimum.

The acting Editor, Mr. Choles, was loaned to Defence and the issue of such reports and bulletins as were printed was entrusted to the Librarian.

On account of the advances recently made by the Agricultural Press, the cessation of the journal was not so serious a matter as it would have been a few years ago, but nevertheless its loss has been severely felt both by the Department and by the public who, judging from the testimonials that have been received and the frequent appeals made by individual farmers and by the Agricultural Unions and other bodies for its re-issue—even if a charge were imposed for it,—found it extremely useful.

The results of a number of the researches conducted by the different Divisions have been published in the Transactions of learned societies and institutions and in magazines, which has saved expense but is otherwise regrettable as the results are scattered and frequently not readily accessible for reference, and they are also not available for exchanges with Departments and Institutions from which we receive publications of the greatest value to us. At the present time we have a considerable number of bulletins and articles that would be very useful to farmers on hand awaiting publication and it is to be hoped that the journal and other publications will be resumed at the earliest opportunity.

The library is gradually becoming established and is proving most useful, though it is still far from what it ought to be. A library is indispensable to the work of a Department of Agriculture under any circumstances, for it is impossible to work without books of reference and information as to what is being done in other countries, and it is doubly so in South Africa where there is no other collection of agricultural literature to refer to.

It has recently been arranged to lend books from the library to farmers and others interested in agriculture on certain terms; the plan has been favourably received and promises to be helpful, but if it becomes as popular as it ought to become, it will be necessary to increase the number of copies of the more popular works, as it will not do to allow books out of the library that are constanly needed for reference by the officers of the Department or by the public, particularly journalists and students who are resorting to it more and more for that purpose. Efforts are being made to provide the various Divisions of the Department with such works as are constantly required by them and also the Schools of Agriculture and Experiment Stations. At present there are 5,645 bound volumes in the library and about 133,000 bulletins and leaflets, and approximately 11,800 works are deposited with the Divisions and Schools. Last year 616 volumes were added to the library and 1,548 periodicals and bulletins were obtained by purchase or exchange. Owing to the necessity for keeping expenditure within the lowest possible limits the grant for the library was reduced but it is sincerely hoped it will be restored again as soon as circumstances permit, as many books are still urgently required.

Division of Co-operation.

There are at present seventeen Co-operative Agricultural Societies in existence in the Transvaal and one in the O.F.S., established in terms of the Co-operative Acts of the two Provinces; and three more are in process of formation in the latter Province. The affairs of the societies are discussed in detail by the Registrar in his report. One society was liquidated during the year and the condition of four others is unsatisfactory; the finances of the remainder are said to be sound.

The societies have 10,825 members and their turnover was as follows:—919,891 bags of mealies, 2,057,203 lbs. of tobacco and £107,039 worth of other produce sold on behalf of members, and £139,052 worth of agricultural implements and machinery and other requisites were purchased and disposed of to members, making a total turnover of something like £850,000.

The societies have undoubtedly done a great deal of good in assisting farmers to dispose of their mealies and tobacco and in steadying the trade in those products, and also in developing the cotton industry in Rustenburg; whilst, beyond the expense of supervision, they have cost the country nothing.

On the whole the Registrar speaks hopefully of the future, though it is evident many of the societies have much to learn and to do before they can attain the position they ought to occupy. Their chief errors have been credit sales, excessive advances on produce sent to them for sale and holding produce for a rise in the markets, or in other words, speculation, all of which are contrary to the principles of co-operation. The first two are being dealt with and it is hoped will shortly be stopped altogether.

The troubles in which the societies have become involved are attributed primarily to lack of knowledge and supervision on the part of the Directors and only education and constant attention can overcome them. The large areas covered by some of the societies render it difficult for the Directors to keep closely in touch with the management, unless they happen to be chosen from members living near to the headquarters of the society, which may not always be desirable, and they also render it impossible for many of the members to come in contact with the society as intimately as they ought to, both for their own good and that of the society, and one of the great benefits of co-operation, which is its effect on the character of the people co-operating by stimulating and educating them and encouraging thrift and business methods, is lost. Moreover, for want of active interest on the part of the members, societies are apt to fall into the hands of a clique, or to be run entirely by paid officers, which as experience proves frequently leads to disaster.

A large membership has many advantages, but they may be more than counterbalanced by the disadvantages attaching to an over-large unwieldy area. In a large thinly populated country like this large areas cannot always be avoided, and when they cannot they must be accepted; but every effort should be made to guard against the drawbacks attaching to them and to keep the members in touch with the society and with what is going on as closely as possible.

The principle of unlimited liability which has come to be regarded as essential to co-operative societies like those under consideration has also not proved an unmixed blessing: it is designed to assist societies to raise money advantageously and to compel the members to take an interest in the admission of members to the society and the management of it in order to safeguard themselves. It has done the first, but so incredibly easy going and indifferent are many farmers, that in some instances it has utterly failed in the last two. Persons have been admitted to membership without any qualifications and little attention has been paid to the way the money has been spent or the affairs of the societies conducted even though very large sums were at stake.

One often hears of the reluctance of farmers to co-operate, but as a matter of fact the trouble has not been to get them to form or join a society, which as a rule they do readily enough, but to persuade them to look after the society after it has been established.

Besides the societies referred to there are a number of societies formed on semi-co-operative lines, with limited liability and the right to pay dividends up to a certain amount before making a distribution to suppliers or purchasers, as the case may be, and they are increasing. Some of these societies, mostly wineries and creameries, which were formed by the Governments of the Cape and Orange River Colony shortly before Union, received considerable loans from Government, but those formed since Union have not received any aid from the Government beyond such advice as the various experts of the Department have been able to give. These are mostly situated in districts that are fairly thickly populated and in which the production of the products in which they deal is a leading feature and the farmers are progressive.

The latest development has been the establishment of co-operative societies known as "Egg Circles" for the collection, grading and marketing of eggs; the movement is very promising and thoroughly deserving of success.

There are still many subjects, such as insurance against hail which is badly needed in this country and is eminently a subject for co-operative effort, that deserve attention and it is also obvious that co-operation is the best way of assisting small holders and persons with limited capital and perhaps not much experience in farming to become established on the land, and to do this extensive sustained missionary efforts will be required.

There are 5 Co-operative Creameries in existence in the Cape, 9 in the Orange Free State, 3 in Natal and 3 in the Transvaal, also 3 Cheese Factories in the Cape Province and 1 each in the Orange Free State and Transvaal.

Generally speaking, all the Co-operative Creameries and Cheese Factories had a successful season during 1915-16. The output of the 20 Creameries during the twelve months ending 31.12.15 was 4,474,143 lbs. and of the 5 Cheese Factories during the same period 231,033 lbs.

There are seven Co-operative Wineries (Cape Province). That at Stellenbosch went into voluntary liquidation in September, 1915. The amount due to the Government by this Company at that date was: Principal—£5,213 15s. 7d., and interest—£53 11s. 7d., making a total of £5,267 7s. 2d. Endeavours are being made to reorganise the Company but the chances of success do not appear to be hopeful. One of the Wineries has been working at a loss for some years, but the remaining five are in a fairly sound financial position.

The Turkish Tobacco Warehouse at Paarl and certain Dried Fruit Companies in the Western Province are doing good work.

The Natal Agricultural Co-operative Union, Limited, has now over 2,000 members, and its turnover for the year was £178,234. The Society was established without Government aid and it proposes to extend its activities to the sale of live-stock, the establishment of a wool mart, the manufacture of bone dust, etc.

The Farmers' Co-operative Meat Industries, Limited, has also been formed during the past year. The object of the promoters was the securing to the members of full benefit from co-operation in the sale of slaughter stock for the oversea market. The Company has leased from the Government the cold storage erected by the late Government of Natal at Pietermaritzburg, and slaughters cattle for its members for export of the meat to the London market. This Company, which has a capital of £20,000, has also been floated without Government assistance.

Division of Dry Farming.

The Dry Land Agronomist has been fully occupied in preaching the gospel of dry farming, in giving advice through the post, and lecturing and conducting co-operative experiments, and he has aroused a great amount of interest in the better utilization of the soil in the drier parts of the Union, and inspired many farmers in those areas, who, as a rule, are backward and unprogressive, to bestir themselves and improve their methods.

The sub-stations at Warm Baths, Pretoria and Vryburg have been closed down. They were not much resorted to by farmers, and the cost of maintaining them was considerable in the neighbourhood of £800 per annum each—and as they were devoted entirely to simple field trials of varieties of crops and methods of cultivation and manuring, and not to investigation of a scientific character, it was decided to discontinue them and to conduct the tests on private farms throughout the Union. By doing so it is hoped they will be brought to the notice of more people and prove more useful, for conditions of soil and climate vary so greatly that the ultimate test of any particular crop or method of cultivation or manuring to be entirely satisfactory must take place in the district, or better still on the farm on which it is to be grown or put into practice.

Further, the system of co-operative experiments involves the visiting of farmers by experts, and their coming into touch with a wider circle of farmers, and they are also more elastic than the sub-station method, as they can be changed from one district or portion of a district to another as desired, whereas the station cannot.

It is thought that by making the change referred to, not only will savings be effected, but more good will be accomplished.

Guano Islands.

Notwithstanding the increase in the price from £5 to £7 10s. per ton, the demand for guano far exceeds the supply. The consumption is still almost entirely confined to the South-Western districts of the Cape Province. Compared with the prices charged for artificial fertilisers, even in normal times, the guano is very cheap and it seems strange that such a valuable manure should not be more generally appreciated.

The yield for the year was 7,220 tons, a decrease of over 900 tons on the previous year's yield, but still above the average annual yield.

The revenue for the year was £73,643 and the expenditure £31,682, leaving a profit of £41,961.

It has been the practice of recent years to maintain a reserve and to supplement the supply in lean years. The reserve in hand last year will be very useful now that there is such a dearth of fertilisers on account of the war. Owing to the increase in the cost of freight and of bags and supplies the expense of collection has gone up considerably.

The average composition of the guano disposed of during the year was nitrogen, 10·47 per cent., potash, 1·84 per cent., phosphoric oxide soluble in water, 3·2 per cent., ditto in citrate solution, 10·42 per cent.; total phosphoric oxide, 10·85 per cent. Lime 10·5 per cent.

Division of Grain.

In the absence of Mr. Nussey, lent to Defence, Mr. van Niekerk has been in charge of the Division.

The 1915 maize crop was the largest on record, the estimated yield being 10,250,000 muids. During the period covered by this report 2,123,383 bags of maize were exported, made up partly of the 1915 and partly of the 1914 crop. The quantity exported of the 1915 yield is better ascertained by taking the year ended 30th June, 1916, during which 2,484,000 bags were shipped. A large quantity was consumed locally, in addition to the Union's ordinary requirements, on account of the unprecedented drought in the midland and eastern districts of the Cape Province. The surplus production over ordinary consumption was estimated at three million bags.

Serious shortage of shipping threatened at the beginning of the season. Active steps were taken by the Government to secure steamers in addition to those which ordinarily traded between South Africa and Europe, and merchants also chartered vessels in the open market. Freight rates were high. The ordinary rate of 10s. per ton by the Union Castle S.S. Company's vessels was raised on the 27th March, 1915, to 30s., and on the 17th July to 52s. 6d., and fixed on the 6th September at 48s., and on the 11th September at 40s. On the 1st January, 1916, the rate was again increased, on this occasion to 63s., at which it now stands. Considerably higher rates were charged for vessels privately chartered—86s. to 90s. by sailing ship, and up to 115s. by cargo steamer. South Africa was able, however, to secure, on the whole, favourable freight rates compared with those paid by Argentine shippers.

The quality of the maize exported during the season was excellent, and very little was rejected for unsoundness or other reasons. The dryness of the grain is a very satisfactory feature, as it travels so well, and grain that has become dry through ripening in a bright, dry climate, is preferable to grain that has to be dried or conditioned artificially.

No complaints were received of the grading, which appears to have given complete satisfaction.

The price of maize in London varied from 35s., c.i.f., for No. 2 White Flat on the 1st May, 1915, to 30s. 9d. in September, from which date it steadily rose to 52s. in February, 1916, and dropped to 47s. on the 1st April, 1916.

3,000 bags of barley and 85,466 bags of Kaffir corn were exported to the United Kingdom, the latter for the first time in quantity, and 50 bags of lucerne seed to Australia, the first shipment of this seed that has left the Union.

Australia entered very largely as a buyer of South African maize, no less than 632,190 bags being shipped to the Commonwealth in addition to about 6,000 bags to New Zealand. Practically the whole of the remaining quantity exported went to the United Kingdom.

The Annual Maize Conference, at which the various sections of the community interested in the export trade were represented, was held. The resolutions passed and the action taken thereon are given in the report of the Chief Inspector of Grain (Appendix XVI.). The value of these Conferences need not be dwelt on; they afford an opportunity of ventilating and considering various views, lead to improvements in the handling of maize, facilitate the administration of regulations, and give confidence to shippers and buyers in the conduct of the trade.

BRANDS.

The legislation relating to brands in force in the Union varies in the different Provinces, and in Natal there is no Brands Act. The need for uniformity is felt, and is from time to time given expression to by Agricultural Unions, and there is a unanimous feeling in favour of an extension of the Transvaal Act to the whole of the Union, with such minor amendments as have been found necessary in practice. The Orange Free State and Cape Acts leave the choice of brands and of their position on the animals to the applicants, while the Transvaal Act limits the choice to such of a series of brands arranged on the three-piece system as have not already been allotted, and also prescribes the position they are to occupy on the animal.

Under the Transvaal system brands cannot readily be altered, and they are easily registered and traced, as they are capable of being arranged alphabetically in a directory, whereas the Free State and Cape brands may be of any design, even a hieroglyphic, which cannot be reproduced in any particular order, and can in many cases easily be "faked" by anyone so disposed. Complaints have recently been made of the increase in the number of stock thefts; a sound system of registration of brands which can be easily recorded and traced should greatly assist in preventing them and in facilitating the recovery of animals that have strayed, and also help the Department in dealing with contagious diseases.

Further a proper system of branding would prevent undue damage to hides, complaints of which have from time to time reached the Department from tanners in Great Britain.

The number of brands registered in the various Provinces to the 31st March, 1916, is as follows:—

Transvaal, 19,377; Orange Free State, 1,486; Cape of Good Hope, 5,472; total, 26,335.

FENCING.

The Fencing Act of 1912 (No. 17), appears to work satisfactorily; at any rate no complaint has reached the Department against any of its provisions, nor have any amendments been suggested. The obligatory provisions of the Act are gradually being extended to those parts of the Union in which compulsory contributions by adjoining properties are not already enjoined by law. The machinery of the Act is simple, and from an administrative point of view it entails a minimum of labour.

CROP AND LIVESTOCK REPORTS.

Beginning with August, 1915, a system of crop and livestock reports was instituted, enabling the Department to report monthly on the condition of the principal crops in season, and of the livestock, as well as to estimate the area under cultivation to each crop and the probable production.

As the last census was taken in 1911, estimated production can be arrived at in respect only of those crops which are partly exported or imported, and in regard to which, therefore, local consumption can approximately be arrived at. The absence of an agricultural census of more recent date, therefore, reduces the value which the crop reports would otherwise have. The system adopted is modelled on one which has proved successful in other countries. In each district of the Union in which the principal crops are grown extensively farmers have been selected who send the Department a monthly report dealing with the crops which happen to be in season.

In addition to farmers, sheep inspectors, stock inspectors and other officials of the Department, whose work is of an itinerant character supply reports. The number of correspondents in each district varies according to the interest taken locally in the matter, the average being six. About the 20th of each month a card is sent to each correspondent, from whom a report is required in regard to a crop then in season. The cards are five in number, and are reproduced in Appendix XXII. The correspondent fills in the particulars asked for on the last day of the month as indicated on the card or cards in respect of crops in his particular neighbourhood. The correspondents are so selected as to be fairly evenly distributed over the district. By the 8th of the following month the tabulation of the cards is completed, and a report drawn up on the basis of averages—first the average for a district, secondly the average for groups of districts having more or less the same climatic soil and other characteristics, thirdly the average for each Province, and, fourthly, the average for the Union. The success of the system depends upon the interest taken by correspondents in the work required of them. The reports to be furnished occupy only a few minutes each month. At the same time it is necessary that correspondents observe intelligently and pay due regard to accuracy. It cannot be expected that a work of so comprehensive a character, although entailing little work on correspondents individually, will leave nothing to be desired. A considerable amount of education and persuasion is necessary before full success can be obtained. It is evident, however, that more and more interest is being taken in the matter. Some correspondents have not sent in reports regularly, and some have even shown indifference, but others again have evinced much interest, and have even, of their own accord, furnished information in addition to what was asked of them, simply because they thought that such information would be useful. The Department has also been voluntarily approached with offers of assistance, pointing apparently to the fact that a forward movement is taking place. Additional correspondents continue to be obtained also by the efforts of officers of the Department when on itinerant duty. With the co-operation of farmers themselves there should be no difficulty in making the reports a complete success.

ADULTERATION OF WINES, SPIRITS AND VINEGARS (ACT 15 OF 1913).

During the year 436 samples of wines, spirits and vinegars were purchased for analysis in the following districts of the Cape Province, viz.:—Bathurst, Bedford, Bredasdorp, Cape (including Cape Town), Caledon, Cathcart, De Aar, George, Graaff-Reinet, Hope Town, Kimberley, Komgha, Malmesbury, Molteno, Mossel Bay, Oudtshoorn, Piquetberg, Port Elizabeth, Riversdale, Robertson, Somerset East, Stellenbosch, Stutterheim, Swellendam, Uitenhage, Umtata, Victoria East, Wellington, Wodehouse, and Worcester: 306 samples were also purchased for analysis in the Witwatersrand area, Pretoria, Barberton, Durban, Umzinto, Port Shepstone, Bloemfontein, Parys, and Kroonstad, making in all 742 samples purchased and analysed, as compared with 770 during the previous year.

The results of the analyses are shown in the subjoined table:—

Article.	No. of Samples.	Adulterated or Deficient.	Incorrectly Labelled.	Artificial or not Genuine.	No. of Prosecutions.	No. of Convictions.
Wine	104	2	3	1	2	—
Brandy	328	34	13	4	29	4
Whisky	151	7	10	—	6	1
Gin	35	3	—	—	3	—
Rum	1	—	—	—	—	—
Vinegar	117	45	56	1	44	29
Liqueurs	6	1	—	—	—	—
	742	92	82	6	84	34

Of the samples purchased the percentage found to be adulterated, deficient or not genuine is therefore 13, the same as last year, mainly accounted for by deficiency of acetic acid in vinegars, and brandy found to be under strength or wine brandies found to be deficient in higher alcohols and secondary products. While the percentage is no less, it may be observed that new ground has been broken in the Witwatersrand area, where a large number of contraventions came to light. Unfortunately it was found very difficult to secure convictions on the Witwatersrand, which accounts for the number of convictions, as shown in the above table, being disproportionate to the number of prosecutions. The prosecutions generally failed on account of persons charged pleading, under Section 33, that they were not a party to, had no knowledge of, and had no means of detecting or preventing the adulteration, and being given the benefit of any doubt which existed. Recently, however, the Magistrate of Krugersdorp convicted in a case in which he considered that the licence holder had the means of satisfying himself that the brandy sold was under the legal strength. This gentleman appealed against the conviction, and the Supreme Court in dismissing the appeal made it clear that it was for the person charged to satisfy the Court when he pleaded lack of guilty knowledge under Section 33. The Supreme Court was not satisfied that the appellant had established his *bona fides*, and, therefore, was not entitled to the protection of Section 33. Since this judgment a number of convictions have been obtained notwithstanding the recourse of persons charged to the Section mentioned. Administrative steps have also been taken which render it difficult for persons charged to seek the protection of Section 33 in cases of adulteration in the bar. It may be mentioned that it is a common form of adulteration to add water to spirits to an extent which reduces their strength below the legal limit.

TRADES COMMISSIONER.

During the year the Trades Commissioner in London, Mr. C. du P. Chiappini, paid a lengthy visit to South Africa in order to get in touch with recent developments, and to discuss matters relating to oversea markets for our products with the farmers. Mr. Chiappini travelled extensively whilst here, and addressed numerous meetings of farmers and others interested in the export of various products, in the course of which he excited a great deal of interest, and imparted much useful information. Mr. Canham acted for Mr. Chiappini in London during the latter's absence. They have both been indefatigable in their efforts to assist exporters, and have helped the Department in many ways, and we are greatly indebted to them. I am sorry to say I found the Commissioner's office in London to be by no means as well supplied either with samples of staple products of the country or of illustrations of its possibilities and information regarding it as it ought to be: and also the Imperial Institute. So far both the Trades Commissioner and the Imperial Institute have depended upon the various Departments to send such products for exhibition and such information as they thought fit, but in accordance with the old adage that "everybody's business is nobody's business," this has not proved satisfactory. It is to be hoped that when the war is over and things again become normal, a special officer will be appointed in one or other of the Departments here to obtain and forward material and information for reference and exhibition in London, and also to collect material for other exhibitions as they occur from time to time.

IMPERIAL INSTITUTE, LONDON.

As usual the Institute has been most useful to the Department in reporting upon the scientific and commercial value of products submitted to it, and in furnishing information upon many matters relating to the development of the resources of the country.

When in London I visited the Institute on several occasions; it is beautifully kept, and the collections there—though, the Union exhibit is, by no means as complete and up-to-date as it ought to be—are most attractively displayed and very useful for reference. The laboratories are extensive and well staffed, both on the scientific and technicological sides, and they are in close touch with the industries concerned with products produced, or likely to be produced by us, and, in my opinion, they constitute the best and most economical agency for advising us on products that are not yet on the market in the ordinary way, and on the improvement or disposal of many that are. The question of supplying exhibits and information for the Institute is referred to in my remarks on the Trades Commissioner's office.

INTERNATIONAL INSTITUTE OF AGRICULTURE, ROME.

Although greatly handicapped by the war the Institute has continued its work, and has compiled and published a vast amount of valuable statistical and other information.

Sir James Wilson, K.C.S.I., of the Board of Agriculture and Fisheries, London, has kindly continued to act as representative of the Union in the Council of the Institute, and he has forwarded to us many most useful reports on the work of the Institution and on the world's supply of wheat and also on other matters. Our best thanks are due to him for the trouble he has taken on our behalf.

AGRICULTURAL SOCIETIES.

Despite the withholding of grants by the Government and the dislocation caused by the war, the whole of the principal show-holding societies, with the exception of Durban, whose yard was occupied by the military authorities, held shows during the year, but unfortunately many of the smaller societies in the country districts were unable to do so. The smaller societies have not the same facilities for raising money as the larger ones have, whose headquarters are in the big towns, and consequently they are more dependent upon Government for assistance, and if it is not forthcoming many of them cannot hold shows. The acute political differences that unfortunately prevail in certain parts of the country also upset many societies, and have completely put an end to their activities for the time being.

The stoppage of the smaller shows is regrettable, as they play an important part in the development of the country by attracting and influencing many people who are not able to afford the time or money to exhibit at the big shows, or to visit them, or for other reasons are not inclined to do so, and also by providing a little local festival they help to vary the monotony of life in the country, and supply something akin to the fairs that used to prevail in the older countries.

The shows that were held were on the whole very successful, the number of the exhibits, particularly livestock, continue to grow, and there is a vast improvement in the quality of them, and in the way they are prepared for show; the management of the shows and the judging are also infinitely better than they were a few years ago, and in the best of them leave little to be desired: taken all round the shows are annually becoming more useful and more resorted to for educational and business purposes.

It is hoped the grants will soon be renewed, for though the large societies managed to get on without them they were much hampered by their suspension, and had to postpone many greatly needed extensions and improvements, whilst as stated the smaller societies were still more seriously affected. If the grants are withdrawn altogether the work of the big societies will suffer, and many of the small ones will have to shut down, and sacrifice buildings and improvements that have been acquired at much labour and expense, and towards the cost of which the Government has contributed.

A new development has been the holding of special shows at suitable times of the year for fat stock, maize and citrus fruit. The poultry societies whose efforts are not confined to holding shows have been active as usual, and have held some excellent conferences and exhibitions, and are also interesting themselves in "Egg Circles," which are referred to elsewhere, and laying competitions. Clubs are also being formed for the promotion of special breeds like Wyandottes and South African White Utility Leghorns.

In addition to the show-holding societies and the Agricultural Unions, a number of societies or associations have sprung into existence of recent years, which concentrate their attention on certain phases of the farming industry, such as the South African Stud Book Society and the Shorthorn, Friesland and other breed societies, which are off-shoots from it, Cow Testing Associations, the Maize Growing Association, the Viticultural Union, and many others.

RAILWAYS.

In the course of the year 556 miles of new railways were opened for traffic; they were located mostly in the country districts, and should prove very helpful to farmers.

WEATHER.

A brief report of the weather experienced during the period under review, kindly furnished by the Chief Meteorologist, is included in the appendices. With the exception of the Cape Peninsula and the South-West the rainfall was below normal over almost the whole of the Union; in many parts a severe drought was experienced, and in certain districts in the Cape Province the farmers suffered so heavily that the Government had to take measures to assist them through a Commission appointed for that purpose.

CROPS.

Many of the crops have already been referred to under the notes on the Divisions of Grain, Horticulture, Tobacco and Cotton, and on the Wattle Bark.

On the whole the crops suffered from drought, with the exception of those in the winter rainfall area in the South-West of Cape Province.

The *wheat* crop for the year 1915 was estimated at 1,943,000 muids. More had been sown than in the previous year, but the drought referred to was responsible for a shortage of 10 per cent. on the preceding year's record production of 2,159,000 muids.

The *oats* crop was better than in the previous year, but *barley* showed a smaller return. In regard to both a larger area was put under cultivation.

Estimates of the *Kaffir corn* crop were not obtained for 1915. Like in the case of maize, the production of Kaffir corn in that year probably constituted a record.

Wattle growers experienced great difficulty in disposing of their bark; previous to the war the greater portion of the bark went to Germany, where the tannin was extracted and sold in liquid or solid form to tanners, who have to a great extent discontinued the use of bark in favour of extracts; with the outbreak of war this market was abruptly closed to them. As it happened England was able to take a certain amount of bark, and new outlets were found for it in America and Russia, so the position was not quite so serious as at first it seemed likely to be. Though the prices realized for the bark were scarcely high enough to compensate for the great rise in freight fortunately the growers have been able to dispose of the wood to advantage as pit props, which has helped them considerably.

After a delay which is inexplicable in view of the advantages of extract over bark and the cheapness of fuel in Natal, steps are being taken to prepare it, and one factory is already in operation in Pietermaritzburg, and another is in course of erection in Durban.

LIVESTOCK.

Sheep have already been referred to under the heading Division of Sheep and Wool. On the whole owners of livestock experienced a trying time on account of the drought, which inflicted heavy losses upon them, and emphasized the folly of keeping more stock than the supply of water and food warrants. Though this is a semi-arid country, and droughts of varying intensity are of frequent occurrence, the lessons taught by them are soon forgotten, and after two or three good seasons farmers proceed on the assumption that droughts are a thing of the past, and that in future each year will be a good one; consequently the farms become overstocked, and no provision is made for the evil day, so when the droughts come, as they are bound to do, heavy losses are sustained, which by a little forethought and prudence might have been greatly mitigated if not entirely avoided.

During the last decade there has been a striking improvement in all kinds of livestock, including poultry. High class livestock have been imported into South Africa from time to time since the early days of its settlement by Europeans, but the efforts of the importers were mainly confined to the introduction of the animals, and it was not till towards the close of last century that a few progressive farmers residing chiefly in the South-West and South-East of the Cape Colony and in Natal seriously took in hand the improvement of livestock by good management as well as by importation.

After the Anglo-Boer war interest in stock breeding increased rapidly, the farmers already engaged in the breeding of pure bred stock extended their operations, and their ranks were augmented by other enterprising farmers and by wealthy men from the towns and by settlers from oversea, whose knowledge of the points of livestock and of their management has proved a great asset to the country.

The efforts of the breeders were seconded by the Governments of the various Colonies. The investigations of the Division of Veterinary Research and of the Veterinary Division have resulted in the eradication or control of many of the diseases that inflicted such heavy losses upon stock farmers and rendered the importation of animals from abroad so risky; the adoption of dipping in tick infected areas and the fencing of farms have also greatly helped to check diseases and promote the health of the animals concerned.

The Schools of Agriculture which have large farms attached to them, and the Stud Farms established in the Transvaal and Orange Free State after the war, but now discontinued, helped the movement greatly by importing high class animals of all kinds, and leasing or selling sires to farmers, and also by enabling us to acquire information on the best manner of treating the various breeds of livestock in this country, and in furnishing object lessons to farmers on their management, and providing exhibits at agricultural shows.

The importation of pure bred livestock from Europe freight free under the Mail Contract and the importations of livestock by the Governments of the Colonies prior to Union have also greatly encouraged the breeding of good stock. The staff of the Department, which includes specialists on practically all kinds of livestock, has been very helpful in educating and advising farmers, lecturing, writing bulletins and articles for the Press, judging at shows, grading products for export and so forth. The farmers also are organising themselves and taking steps to promote the welfare of the various breeds they are interested in through the medium of shows, Stud Book and Breed Societies, Cow Testing Societies, Poultry Clubs, Egg-laying competitions and Egg Circles. The development of dairying and the establishment of bacon factories, and the great demand for all kinds of animal products in Europe, which have led to an extension of our export trade, have also naturally given a great impetus to stock farming.

But though great advances have been made of late, there is still much to be learned about the types of animals best adapted to the different parts of the country, and about the management of them and the diseases to which they are subject. The best farmers realize that the farm animals of to-day are not natural products of the veld, but the result of years of careful selection and good management, and that if the standard is to be maintained —and nothing less will suffice for the oversea markets, to which we have to look—they must be treated accordingly, and thought and labour bestowed upon them. But this does not mean that every farmer should breed pure bred animals; as a matter of fact, at the present time a great deal of money is being wasted by the keeping of pedigree stock by farmers who are not able to do justice to them. The breeding of stud stock is a business of itself, requiring exceptional knowledge and facilities, and it should be left to persons competent to undertake it. The proper course for the ordinary farmer to adopt is to provide for his stock as well as he can, to use good constitutioned pure bred sires typical of their breed, but not necessarily show animals, and to cull as many of his unsuitable animals annually, as circumstances permit. In this way he will obtain a collection of hardy, good quality grade animals that will pay him far better and cost far less than an indifferently managed and probably deteriorating collection of pure bred ones.

Cattle, both dairy and beef, have improved wonderfully during the past few years, as the milk records of the former and the exhibits of the latter at the leading shows, and the reports from the London meat market indicate, and there are now many very high class animals in the country, but, as is only natural, a good deal of grading up is still required in the ordinary farm stock, and also in cattle belonging to natives, which if properly developed should be a great asset.

Owing to the activities of the bacon factories pigs suitable for killing have been in great demand, and also pure bred ones for improving the common stock.

Donkeys for breeding mules have been in request, but the interest in horses has not been so keen as could be wished, the reason being probably that the extension of the railways and the extensive use of motor cars has to a great extent supplanted light horses and heavy and medium weight horses are not yet much used for farm purposes.

Notes on ostriches and poultry—which have progressed wonderfully of late—and also a good many additional ones on other varieties of live stock will appear in the report on

Agricultural Education, which deals with the experiments conducted on the various experiment farms.

An account of the live stock imported during the year is given in the report of the Veterinary Division.

IMPORTS.

The import of agricultural products that could be produced in the Union is decreasing, though, it is still far higher than it ought to be. The chief decreases were in meat of various kinds, butter, fresh eggs and tobacco.

Particulars of our imports and exports are included in the appendices.

EXPORTS.

The exports of agricultural produce in 1915 were valued at £9,831,433, against £9,037,570 in 1914. The chief increases were in wool, maize and other grain, meat and tobacco.

There was an increase both in the quantity and value of the wool exported. The former is difficult to explain, in view of the decrease in the number of sheep owing to the drought, but was probably caused by wool being held over for a time on account of the dislocation of the markets that occurred at the outbreak of war and the difficulty of obtaining freight.

The principal decreases were: ostrich feathers, which have been under a cloud for the last few years, owing to overproduction and change in fashion; fruit, due to a bad season and scarcity of freight; mohair, accounted for by the drought and the upset caused by the war; and wattle bark, which is discussed separately.

The great demand for beef in England caused by the war hastened the commencement of the export of beef. As soon as it was apparent that an export trade in meat was beginning in earnest, a conference of persons and bodies likely to be interested in it was summoned to consider what steps, if any, should be taken, to foster and regulate the trade. The conference was held at Durban on 5th October, 1915, and was attended by representatives of this Department, exporting firms, municipalities—which had made provision for slaughtering cattle for export—the Agricultural Unions, Department of Railways and Harbours, and the Union Castle Steamship Company. The Trades Commissioner for the Union in London, who happened to be on a visit to South Africa at the time, also attended. The conference discussed and passed resolutions dealing with the inspection of animals before slaughter, the granting of certificates of freedom from disease and fitness for human consumption, the licensing of abattoirs and various other matters by Government officials, on the lines adopted in Australia and the Argentine. Regulations embodying the views expressed by the conference were promulgated under the Moratorium Act, and immediately given effect to, and so far have worked smoothly and satisfactorily.

In 1914, 819 quarters of beef were exported, and in 1915, 32,897 quarters, and it is gratifying to be able to report that the beef created a very favourable impression in London, and realized good prices. The trade is receiving widespread attention, and every effort is being made to place it on a proper footing.

For some years past efforts have been made to improve the quality of our livestock in order to produce animals suitable for export; these efforts are being intensified, and the Department is carrying on extensive feeding experiments with a view to the production of high class beef as economically as possible. The conveyance of cattle and meat by rail and the slaughtering and dressing of the meat are receiving attention, and all meat arriving in London is examined and reported on by the Trades Commissioner; in this way faults in preparing the meat for market are being corrected.

Although we have made a good beginning there is naturally a great deal to be learned about the export of meat, and in view of its importance to the country and the desirability of starting on the right lines and avoiding mistakes and the large expenditure that will be required to provide for the trade, it is highly desirable that a small Commission should be appointed to visit the chief exporting countries and report upon the way things are managed there.

EFFECT OF THE WAR ON AGRICULTURE.

Considering the magnitude of the conflict now raging, this country has so far been very little affected by it. The most serious feature has been the withdrawal of active enterprising men from the scanty ranks of those engaged in farming to participate in the War, for their absence, even though temporary, cannot fail to affect agriculture detrimentally in many ways.

Sea freight has been limited; the rates have risen considerably, and a good many articles required by farmers have been expensive and difficult to obtain, and a certain amount of inconvenience has been caused thereby, but there has been nothing in the nature of a deadlock. On the other hand, with the exception of wattle bark, which has suffered from the closing of the German market, and fruit, which has been handicapped by lack of cold storage on the ships, and ostrich feathers, which had fallen in value before the War, practically everything the farmers had to sell realised extremely high prices. The high prices have also stimulated the export of meat, eggs, wine and other products, and it is hoped the movement thus inaugurated will result in a permanent export trade in these commodities.

Besides stimulating production and development, as it undoubtedly will, for there is no incentive so powerful as high prices, the War should do good by bringing home to us our dependence upon other countries for many things—including foodstuffs—that could and should be produced here, and even the cost and scarcity of fertilisers and many other farm requisites will not be an unmixed blessing if it impresses upon farmers the necessity for the exercise of economy both in time and material as well as in natural resources, of which there is a great waste in this country, and, above everything else, the importance of rendering the farmers more self-contained in the matter of the amelioration of the soil and the providing of concentrated food for livestock. "The first condition of farming," says Professor L. H. Bailey, a great authority on the subject, "is to maintain fertility," and to this vital matter far too little attention has hitherto been paid in South Africa.

F. B. SMITH,

Secretary for Agriculture.

APPENDIX I.

VETERINARY DIVISION.

ANNUAL REPORT, 1915-16.

As East Coast Fever is still the most important problem with which this Division has to deal, no apology is necessary for beginning this report by outlining briefly the position of the various Provinces with respect to this disease and discussing the general situation in each.

East Coast Fever.

Cape (exclusive of Transkeian Territories).—In this part of the Province the position has distinctly improved. In 1914-15 four districts were infected, East London, King William's Town, Elliot and Maclear, the total number of infected areas numbering thirty. During 1915-16 two of these districts have been taken out of quarantine—Maclear and King William's Town. In the other two districts the total number of infected areas remaining in quarantine has been reduced to six and, as there has not been any serious mortality in these during the past twelve months, there would appear to be good reason to hope that the disease will soon be banished from these districts also.

The removal of the King William's Town district from the list of infected districts relieves this Province from a very serious menace, as native locations such as those amongst which the outbreaks occurred in this district are always difficult to handle, on account of the propensity so frequently displayed by natives for the surreptitious removal of their animals when disease becomes prevalent. Now, however, we have every reason to think the disease has been entirely stamped out, although a careful watch is still being kept over former infected areas lest some unsuspected centre may have been overlooked through the omission of owners to report the occurrence of deaths amongst their animals.

As an offset, however, to the success which has attended our labours in the districts of King William's Town and Maclear, we have to record the occurrence of two outbreaks on farms in the Komgha district adjoining the Transkei border, but as these occurred in an area in which no extensive movements of cattle have taken place, and they were detected before the mortality had become serious, we have good grounds for anticipating that the disease is not likely to extend any further from these two centres.

Were it not for the close proximity of disease in the Transkeian Territories, the position of the remainder of the Cape Province might be now regarded as reasonably satisfactory, but as long as the disease is prevalent in the Transkei danger is ever present.

Transvaal.—Here there are eight districts infected with East Coast Fever, but in most of these the infected areas are more or less circumscribed.

In the Barberton district, during the year 1915-16, there have been 21 further outbreaks of East Coast Fever, all in close proximity to areas already infected, bringing the total number of infected farms in this district up to 60. Fortunately, however, the somewhat isolated position of the district renders the situation less serious than it otherwise would be and, as dipping operations have been carried out so vigorously that no deaths have occurred in the last twelve months on twenty-four infected areas, it will, I think, be obvious that the position should soon show some improvement.

Next to Barberton in the number of its outbreaks comes Pietersburg, with 11 outbreaks, seven of which occurred within the year. In this district an unsuspected centre of infection was recently discovered to the south west of the town, which gave cause for much anxiety, as numerous permits for movements from the infected area had been granted a short time before the disease was detected, but so far the developments have not been so serious as were anticipated and the scrutiny to which this suspected area is now being subjected should suffice to reveal any further outbreaks without serious loss of time. As a precautionary measure one suspected area, including the Groot Spelonken Ward and an adjoining portion of the Zoutpansberg district, has been placed under a five-day dipping order.

This revival of the disease has naturally had a depressing effect upon the development of the district, but, as the farming community have taken very kindly to dipping and many native headmen have already provided themselves with tanks which they are using regularly, the addition of two to the total number of areas under quarantine last year cannot be regarded as discouraging.

In the district of Piet Retief, which comes next, there has been a marked improvement since the presentation of my last report—then there were 21 areas in quarantine, now there are only seven. Two fresh outbreaks have occurred within the year, but as sixteen farms have been released from quarantine our gains are considerably greater than our losses and the position of the district is now better than it has been during the past ten years.

In Carolina there are now eight areas in quarantine, upon seven of which the disease was detected during the present year. All the infected areas are situated in the low-veld portion of the district, which is of a rugged and mountainous character and which borders on Swaziland and the district of Barberton and is chiefly inhabited by natives.

In the Zoutpansberg district there have been two fresh outbreaks of East Coast Fever, making a total of three quarantined areas in all. These lie close together on the edge of the Pietersburg district and are regarded with a good deal of anxiety although the disease at the moment is well in hand.

In Ermelo there has been one outbreak of East Coast Fever on a farm in the immediate vicinity of the infected area in Carolina; and in the Lydenburg district a border farm, lying below the Drakensberg, has been put under quarantine owing to the occurrence of the disease on an adjoining farm in the Barberton district, from which infected stock moved across the border.

Natal.—Although the total number of areas now in quarantine in Natal—212—is less than the number gazetted at the end of 1914-15, when there were 273 infected areas on our register, the position in Natal cannot be regarded as entirely satisfactory, as not only have there been ninety-one fresh outbreaks as compared with thirty-seven the previous year, but many of these outbreaks have occurred in clean areas far removed from any known centres of infection upon fenced tanked farms occupied by Europeans and, in most cases, the source of infection has not been traced. Naturally such a state of affairs gives ground for considerable apprehension, especially when the disease is so widely distributed that twenty-eight magisterial districts are infected and only six—Newcastle, Nqutu, Paulpietersberg, Inanda, Durban and Umhlazi—which form a comparatively small portion of the total area of the Province, are shown as free from disease.

With so many districts infected, space will not permit of my referring to each at length and I must, therefore, refer those desirous of making comparisons to the Outbreak Return attached to this report, but I may state that the Ixopo District is still in a worse position than any other and that Klip River comes next.

While reviewing the position in Natal last year I expressed the opinion that it was both favourable and hopeful, but I must confess I am by no means so sanguine now as I was then. It is by no means easy to say why there should be such a falling off in a Province containing so many dipping enthusiasts as Natal. Probably it is due in part to the fact that the pressure brought to bear upon the farming community for the purpose of encouraging the erection and use of dipping tanks by giving facilities to those who had them, which were withheld from those who had not, has at last moved a number of those who are sceptical as to the benefits of dipping to put up tanks, less with the object of using them than for the purpose of obtaining permits, and that it is on account of the disregard of the conditions attached to the permits which they obtain that some of these mysterious outbreaks have occurred, while it may be that some who know better and who claim, as some have claimed, to be able to stamp out an outbreak of East Coast Fever by a few months of short interval dipping, prefer to refrain from reporting the existence of disease when it appears upon their holdings on account of the prolonged quarantine which the authorities impose for sound scientific reasons, and by their silence they expose all those who use the roads traversing such infected areas to risks of which users are unaware and to which they would not be exposed if outbreaks were honourably and promptly reported. Whatever the reason may be it is certain that the disloyalty of a few must jeopardise the safety of a loyal and law-abiding majority, and unless the community as a whole subscribes to these conditions, which scientific experiments have shown to be essential for the eradication of East Coast Fever, it will be many a long day before the disease disappears and in the meantime those who are honestly doing their best to support the authorities will have to suffer with their less scrupulous neighbours, while stockowners in the adjacent Provinces will continue to be chary about going to Natal for the well-bred stock which, under more favourable conditions, they would only be too willing to purchase.

In native areas in Natal, Senior Veterinary Officer Power reports that satisfactory progress is being made in many locations, and in others, where the task of tackling the disease has been delayed on account of an inadequate supply of tanks, authority has recently been obtained for the provision of additional dipping facilities whereby the position will be considerably improved. Stamping out disease in native herds in areas where tropical conditions exist (which are favourable for the multiplication of ticks), where natives are unable to look after their own dips and often not too willing to use them, is always a tedious undertaking and an immediate improvement cannot be looked for.

Transkei.—Generally speaking the operations undertaken for the eradication of disease in native territory have not yet reached a stage at which we can reasonably expect to see good results. In those districts occupied mainly or exclusively by natives, the tank construction programme projected by the Transkeian General Council and by the Government is being carried out as funds are available, but many districts are still short of their full complement of tanks, and in most of these the disease is still eating its way slowly into the Native herds whenever practicable cattle are being dipped, but as each district is now permitted to raise funds for the purchase of dipping materials in whatever way it considers best—some doing it by an annual levy of so much per animal, some by a prescribed charge on the individual hut owner and some by the imposition of a dipping fee collected at the tank at which the animals are dipped—the cost to the native varies considerably in different districts. Not only is this the case, but in some areas dipping is carried out with greater thoroughness than in others and with greater satisfaction to the owners. The present lack of uniformity in the manner of finding the money to buy dip does not appear likely to yield better results than the former system of centralising the control of these operations at Umtata, and it appears to me in the case of a community so indifferently educated as that of the Transkei a benevolent despotism would be more appropriate to present conditions than the adoption of a system of decentralisation, for which the majority of natives are hardly ready, although it may very well be that it is more politic to lead than to drive and that the ultimate results of the former may be better.

Throughout the Territories generally there have been only 31 fresh outbreaks as compared with 58 last year and, although the spread of the disease has not been entirely arrested it is satisfactory to observe that in some native districts, at all events, and more particularly in the case of districts bordering on the Cape Province the disease is comparatively inactive. Leaving the districts which are largely European out of consideration for the moment, the position is most satisfactory in the Idutywa, Nqamakwe, Xalanga and St. Marks Districts, but the condition of some of the others will leave a good deal to be desired. In many the mortality amongst adult cattle is no longer serious because most of those are immune, either through inoculation or through having contracted the disease naturally when young, but in all districts which the disease has thoroughly established itself there is a heavy mortality amongst young stock, which varies from 30 to 80 per cent., which keeps up veld infection and perpetuates the disease.

In those districts in which European farmers have established themselves the position is better—Mount Currie, which had eight areas in quarantine on the 1st April, 1915, has now only four, of which one only is known to be infected, and this is due to come out of quarantine at the beginning of June if no more deaths occur in the interval. In consequence of the improved condition of the district it has been found possible to relax the restrictions formerly imposed on ox transport and now the main roads of the district are open, the town of Kokstad is out of quarantine and the confidence of the farming population has been restored to such an extent that they no longer hesitate to introduce pedigree cattle from Natal or even from oversea for the purpose of improving their lands.

The district of Matatiele has also shared the prosperity of Mount Currie, although its position is by no means so satisfactory, as the disease has established itself on Kaka's Location and also on two adjoining farms in the vicinity of the Mount Fletcher border. Fortunately these areas are off the main line of traffic between the railhead and the heart of the district and it has been found possible to maintain ox transport in the major portion of the district, but should any further outbreaks occur there is considerable danger of the situation in this district becoming acute, as equine transport is scarce and difficult to obtain while the district is very indifferently provided with tanks and the suspension of ox transport which might become necessary if there is any further spread of the disease would undoubtedly be a very serious handicap.

In Umzimkulu, the only other district in which there are any number of European farmers, the state of affairs at the beginning of the year was the reverse of satisfactory, as most of the large locations were infected throughout and only inadequately tanked. The position has now improved, however, and with the provision of the necessary tanks in their Locations and the inauguration of a vigorous dipping policy, I see no reason why satisfactory progress should not be made, as in a district in which Europeans and natives live side by side natives are generally benefited by the example set by the former and endeavour to follow their example.

Dipping and East Coast Fever.

Generally throughout the Union, dipping operations during the past year have been seriously interfered with on account of a falling-off in the supplies of dipping material and a considerable advance in price. So acute did the shortage become at one time that in many places arsenite of soda was unprocurable and this scarcity even threatened to bring the dipping of cattle in infected areas to a standstill. Urgent representations were made to the Government by various bodies of farmers, asking that suitable steps be taken to ensure a regular supply of dip, and as a result of the efforts which were made the position has improved somewhat, but the difficulties which at present exist in connection with arranging for conveyance oversea make the position still somewhat precarious and it might at any time be found necessary to restrict the sale of dipping material except in the case of actively infected areas.

In the Cape Province interest in the erection of dipping tanks has waned to a lamentable degree. Our returns show that throughout the Province generally 1,409 cattle dipping tanks have now been erected, the larger proportion having been built in districts invaded by or threatened with invasion by disease, and two more are under construction. After all that has been said and written on the subject of cattle dipping, and with the example of other Provinces before them, it is a matter for regret that the Cape Province, which is in daily danger of invasion by East Coast Fever, should still be so indifferently provided with facilities to fight this and other tick borne diseases.

In the Transvaal, where stockowners have learned from bitter experience what an invasion by East Coast Fever actually means if proper provision has not been made to combat it, things are no better. The total number of tanks now erected in this Province is 717; of these, 146 were built during the current year and, in addition to these, 21 are in course of construction, but if we leave the districts in which disease actually exists or has existed out of consideration the number of tanks is absurdly disproportionate to the number of farms into which the Province has been divided, most of which carry stock to a greater or less extent.

In Natal there are now 3,557 tanks in use and 34 more in the course of construction. The policy of the Department in controlling the movements of stock has, undoubtedly, had some effect in swelling the total number of tanks which have been erected in Natal, but at the same time, while there is still room for more tanks, there is little reason to doubt that by far the greater number have been put up by farmers who appreciate the benefits of cattle dipping, and in time to come the cattle farmer in Natal will reap the benefits of his enterprise, while farming operations will be conducted with greater economy and less loss and the carrying capacity of the farms will be relatively greater where stock are regularly dipped than on farms which are unprovided with dipping tanks.

In the Transkei the erection of dipping tanks proceeds steadily, but more are required before some of the districts will be in a position to tackle the problem of getting rid of East Coast Fever with any hope of success. The number of tanks in use at the 31st March of this year was 656, and 14 in course of construction.

In the Orange Free State, at the end of last year, seventy cattle dipping tanks had been erected—now the number has been increased to 128, with 14 more in course of construction. This would appear to indicate that the farmers of the Free State are at last beginning to realise that a dipping tank may be a profitable investment.

TUBERCULOSIS.

Next, perhaps, to East Coast Fever in importance from an economic point of view comes Tuberculosis. As far as this disease is concerned the position is still unsatisfactory. During the year legislation was introduced, empowering the Minister to arrange for the application of the tuberculin test oversea in the case of animals intended for import, where suitable accommodation was provided and where the Government concerned was prepared to carry out the test in conformity with our requirements. More extended powers have also been given to the Minister for dealing with reacting animals imported from oversea, but the schedule of compensation for reacting animals slaughtered by order of the Minister remains unaltered and, as a consequence, there is still a lack of co-operation between stock owners and the authorities which defeats any efforts made by the Department to deal in a satisfactory manner with outbreaks of the disease.

In the Cape Province, Senior Veterinary Officer Dixon report that the percentage of cattle reacting to the tuberculin test in the Cape prohibited area has materially diminished. This he does not attribute, however, to any abatement of the disease but merely to the fact that those buying cattle for removal from the closed area have been more circumspect in their purchases. The number of cattle tested from the four closed districts during the year is 4,032, of which 2·58 proved to be reactors.

The number of reactors has fallen off amongst locally bred cattle. Through Durban 109 cattle were imported of which 4 reacted to the tuberculin test, bringing the percentage of reactors imported into the Union down to 7·2.

In the Transvaal during 1915-16, thirteen outbreaks of tuberculosis have come to the notice of the Department. Of these the greater number were located in the Witwatersrand. In dealing with these outbreaks 425 animals were tested, 22 were destroyed after test and found to be tubercular, while 6 animals slaughtered before test were found to be infected with the disease.

Statistics obtained from Johannesburg, Germiston and Pretoria Abattoirs show that during the past year 184 cattle and 56 swine killed at these abattoirs were infected with tubercle; the previous year the numbers were considerably greater—291 cattle and 129 swine—but the reduction in the number of infected animals discovered can, I think, only be due to the disposal of infected animals through some other channel than that of the Municipal abattoir.

In Natal, six fresh outbreaks of Tuberculosis were dealt with during the year, involving the testing of 1,006 head of cattle, of which 114 were condemned before or after test. The Senior Veterinary Officer states there appears to be a tendency on the part of breeders of good stock to come forward and have their cattle tested, but he expresses a doubt whether this movement is likely to grow to any extent.

In the Transkei two centres of Tuberculosis were discovered in 1915-16. In the first, 125 in-contacts were tested and only one reactor was discovered, but the second, which has only just been investigated, revealed, as was expected, a very serious state of affairs in a well-bred herd of shorthorns.

In the Orange Free State the Division was called upon to deal with two oubreaks—in one a single animal only was concerned. The other outbreak occurred amongst a herd of pigs; this was dealt with by slaughter of the in-contacts and disinfection of the premises, There has been a very marked increase in the number of reactors found amongst imported cattle tested at the Cape quarantine stations, the percentage of reactors having gone up from 3·26 last year to over ten per cent. during the current year. This I am rather inclined to attribute to the purchase of a cheap class of pedigree cattle for speculative purposes, some of which may have been fortified prior to purchase and, in this way, escaped detection when tested before shipment.

Through Durban 109 cattle were imported, of which four reacted to the Tuberculin test, bringing the percentage of reactors imported into the Union down to 7·2.

ANTHRAX.

In spite of the amount of attention and comment bestowed upon Gall Lamziekte at farmers' meeting and in the columns of the public press, it is, in my opinion, very doubtful whether the aggregate annual losses from Anthrax is not very much greater than the mortality from Gall Lamziekte, although the former is a preventable disease which can be controlled and stamped out by inoculation.

In the Cape Province the Senior Veterinary Officer reports that the disease is extending and, as no determined effort is made for its suppression, the losses in time to come will probably be greater than they have been in the past. European stockowners, also Natives, are now beginning to use vaccine for the protection of their stock in infected areas, but unfortunately many defer inoculating their animals in such areas till after an outbreak has occurred and their losses are frequently considerable. Occasional complaints reach the Division about the vaccine supplied by the Department, but these complaints, Senior Veterinary Officer Dixon thinks, are often due to lack of care in using the preparation: the dose is very small, and it is more than probable that when a large number of animals have to be inoculated that the inoculator, in his haste, is not sufficiently careful in introducing the vaccine under the skin. The Senior Veterinary Officer suggests that this might be obviated by increasing the volume of the dose so that the exact amount to be administered could be more easily determined.

346 outbreaks of Anthrax have been reported in the Cape Province during the year, probably only a small proportion of the total number which have actually occurred.

In the Transvaal Anthrax is still very prevalent, particularly along the Reef. 688 outbreaks have been reported and dealt with as against 529 last year: 1,100 animals have died from the disease and 27,500 head have been inoculated.

In Natal the number of outbreaks continues to be relatively small—34 in all have been reported; 211 head have died and 5,379 in-contacts have been dealt with. The Senior Veterinary Officer states that stockowners readily resort to preventive inoculation whenever the disease makes its appearance.

In the Transkei the Senior Veterinary Officer reports that the losses from this disease have not been heavy—52 outbreaks have occurred, the most serious being one at Ramhlokoana's Location, Matatiele, where 85 deaths occurred. In every outbreak in-contacts were promptly inoculated.

In the Orange Free State Anthrax is becoming increasingly prevalent—88 outbreaks have been recorded: over 500 animals have died and 12,763 have been inoculated.

GLANDERS.

Cape Province.—There have been 22 outbreaks of Glanders in this Province during the past twelve months, 16 of which occurred in the Cape and the surrounding Divisions, where 52 animals were destroyed. The other 6, which involved the destruction of 15 equines, occurred in widely separated parts of the Province. In dealing with these outbreaks 212 in-contacts were submitted to the Mallein test.

In the Transvaal Province there has been a considerable increase in the number of outbreaks of Glanders: 63 were reported and, in suppressing these, 46 animals were condemned before test and 1,537 animals were tested, of which 95 were destroyed as reactors.

In Natal, where there was 9 outbreaks involving 734 animals, of whom 18 were destroyed as infected before or after test, the Senior Veterinary Officer makes the following remark, with which I entirely concur—"In view of the conditions obtaining and the large number of equines distributed about the country from active service, I consider the position with regard to this disease satisfactory and reflecting credit on the responsible officers of the Defence Department."

In the Transkei only 5 outbreaks of Glanders were reported to the Authorities during the year; 7 animals were found to be affected and were duly destroyed.

In the Orange Free State 6 outbreaks of Glanders are recorded. In dealing with these 801 equines were tested, 99 of which reacted and were destroyed, in addition to five clinical cases similarly dealt with prior to test.

LUNGSICKNESS.

Cape Province.—There have been no fresh outbreaks of Lungsickness in the Province this year. The outbreak in Kingwilliamstown, to which I referred in last year's report, died out after the slaughter of an infected animal discovered in April, 1915.

In the Transvaal there was one outbreak of this disease in the district of Pietersburg, two animals were destroyed and found to be infected but no further cases occurred amongst the in-contacts.

Natal and the Orange Free State have remained free from this disease.

Transkei.—2 outbreaks of Lungsickness were dealt with in this Province, neither of which was of much importance, only 3 animals being infected. Vaccine to inoculate in-contacts was unprocurable, but fortunately the disease did not spread. The Senior Veterinary Officer is of opinion that this disease is well in hand and with reasonable vigilance the Territory will soon be free from it.

EQUINE SCABIES (MANGE).

Cape Province.—The Senior Veterinary Officer reports that this disease has been very prevalent in the vicinity of Port Elizabeth, mainly amongst donkeys belonging to kaffirs and coloured transport riders. Outside of this area the disease has given little trouble; 76 outbreaks were brought to the notice of the Authorities; 37 affected animals died or were destroyed as incurable and 200 were put under treatment.

Transvaal.—There were five outbreaks of Mange in this Province during the year, none of which were of any importance.

Natal.—Eleven outbreaks of Mange occurred in this Province; eight affected animals died or were destroyed and 53 animals were treated.

Transkei.—Here there were fourteen outbreaks all of small extent.

Orange Free State.—Four outbreaks of Mange were dealt with by our officers in the course of the year in the Orange Free State.

EPIZOOTIC LYMPHANGITIS.

Cape Province.—Five equines were destroyed on account of their being visibly infected with Epizootic Lymphangitis; two at East London, two at Hankey, Humansdorp district and one at Bayville, Uitenhage.

In the Transvaal one outbreak of this disease occurred in one animal only.

In Natal there were 5 outbreaks, two in Lower Umzimkulu, 1 in Alexandra and 2 in Durban County. The position of this Province so far as this disease is concerned has greatly improved of late years.

Transkei and Orange Free State.—Both these Territories have a clean bill of health for 1915-16.

CONTAGIOUS ABORTION.

This disease is undoubtedly somewhat prevalent, but it is difficult to detect in the absence of information which can only be supplied by the stockowner himself and, as no satisfactory method of treatment is available and the quarantine policy does not commend itself to those concerned, it cannot be said that we are well informed as to its distribution. In cases which have been brought to the notice of the Department, this Division with the assistance of the Research Division has endeavoured to assist owners to free their herds from infection by picking out reacting animals, but the results have not been an unqualified success, probably because infected animals do not give an immediate reaction to the agglutination test when they become infected, and because animals which have ceased to react may still be capable of infecting others.

Particulars respecting the number of outbreaks and their distribution are given in the appended outbreak returns.

TRYPANOSOMIASIS.

The scare respecting this disease appears to have subsided. The results of the investigations of the officers of the Research Department were duly communicated to the Provincial Administration, and are being acted upon. No reports have reached this Division which would appear to indicate that the disease is spreading to any extent outside the fly area.

NON-PROCLAIMED DISEASES.

The Senior Veterinary Officer, Cape Town, has furnished the following notes on non-proclaimed diseases coming under his notice during the past year:—

BLUE TONGUE AMONGST SHEEP.

Following the summer rains outbreaks of this disease were reported from Hopetown, Phillipstown, Britstown, and Prieska districts, but owing to the prolonged drought over the greater part of this Province the disease was not much in evidence, except in the Western Province, where in parts it has been very prevalent, more especially on farms situated along the valley of the Berg River. Serious outbreaks of Blue Tongue in the lower districts of the Western Province are very rare, which I attribute to the scanty fall of rain in this area during the summer months.

EPHEMERAL FEVER (THREE DAYS' SICKNESS).

From reports received it would appear that this disease has been prevalent throughout this Province. In some districts the disease was particularly severe, as many as 40 to 50 animals in a herd being attacked at one time. Very few cases proved fatal, if the affected animals were left alone and not drenched with medicine.

LAMZIEKTE.

Lamziekte appears still to be confined to the sour grass veld area, and cases amongst milch cows and heifers-in-calf crop up during a prolonged drought. No reports have been received that this disease has extended and established itself in the Karroo or sweet veld districts.

GEEL-DIKKOP.

This disease, which attacks both sheep and goats, and is mainly confined to the Karroo districts, was prevalent this summer in the Northern and North-Western Karroo districts, causing considerable mortality. It appears about the same time as Blue Tongue, although it is observed that, unlike Blue Tongue, when the rains are copious and persistent, Geel-Dikkop is not so prevalent. Repeated rain showers followed by hot days are the weather conditions most favourable for its development.

All attempts to produce the disease by inoculation have failed, also feeding experiments with suspected plants.

As the true nature and cause of Geel-Dikkop are unknown, it is hoped that the Director of Veterinary Research will, by investigation, elucidate the cause.

Medical treatment is found successful when the affected animals are treated early, but it would be more satisfactory if we were in the position to advise stock-owners of the true cause of the disease and the rational preventive treatment to adopt.

In the Transvaal and Natal non-proclaimed diseases have not been either prevalent or serious in their character. Horse-sickness claimed remarkably few victims. Blue Tongue was not so severe as usual, and Ephemeral fever, although troublesome in some districts, has not caused any loss or inconvenience to stock-owners.

In the Orange Free State, Senior Veterinary Officer Grist states no cases of Horse Sickness or Blue Tongue have been brought to his notice: Lamziekte has not, in his opinion, been nearly as prevalent as in former years. Cases of Gallsickness have been located at the Glen (Government Farm), Cambrae, Floradale and Bainsvlei, all in the Bloemfontein district, also at Rubenstein, Winburg district, Lemoensfontein, Hoopstad district, and Braemas, Bethlehem district.

Geel-Dikkop has also been rather prevalent in the Orange Free State. There has been no opportunity of making any investigation respecting the so-called White Liver in sheep.

In the Transkei the past horse-sickness season has been remarkably mild. The same applies to blue tongue. A peculiar form of bone disease in donkeys occurring in East Griqualand is now being investigated by the Research Division.

STAFF.

The difficulties which this Division had to contend with last year, owing to reductions of staff through the transfer of Veterinary Officers to the Defence Department for duty in connection with military operations in German East Africa and elsewhere, have been aggravated by the further demands made by that Department for additional professional assistance. Practically half of our staff of Veterinary Officers and a considerable number of Stock Inspectors are now on active service, and as the staff has been further reduced by deaths and retirements there is no doubt that the legitimate work of the Division has suffered very materially. Complaints regarding delays in investigating and dealing with suspected outbreaks of disease have been numerous, but these have been unavoidable, and I have no doubt that when our officers return to their ordinary work they will find many smouldering centres of infection to deal with whose existence is at present unsuspected.

During the year I regret to say that the Department has lost the services of two valuable officers—Senior Veterinary Officer Christy (retired owing to a breakdown in health), with whom I have been intimately associated ever since I entered the Department, and to whose ability and energy I can unhesitatingly testify; and Government Veterinary Officer Pakeman, a zealous and hard-working officer who practically died in harness.

In closing this report it is my pleasant duty to direct your attention to the patriotic spirit displayed by the officers of this Division. Practically all the professional staff volunteered for active service with the Defence Department, and many of the non-professional officers as well, and the chief difficulty with which I have had to contend with has not been that of finding men to go on active service when asked for them, but of holding men back to carry on the ordinary work of the Department. Doubtless there has been a certain amount of heart-burning amongst the men who were allowed to go, but if they have felt disappointed they have not allowed their feelings to interfere in any way with the efficiency of the work which they have been called upon to do, although, owing to our shortage of staff, this has been more than usually arduous and exacting. To those who went and those who have had to remain behind in the clerical, professional and non-professional branches of this Division I must express my indebtedness for the way in which they have performed their duties during the year just past.

To this report I append the following returns:—

1. East Coast Fever return, Union.
2. Port of Entry return; Detailed Port of Entry return.
3. Dipping Tank return.
4. Comparative return of Outbreaks of Proclaimed Diseases.
5. Staff return.

C. E. GRAY,

Principal Veterinary Officer.

ANNEXURE 1 TO APPENDIX 1.—EAST COAST FEVER.

District.	Farms in Quarantine on which cases have occurred during 15 months prior to end of March.		Fresh Outbreaks.		Farms released from Quarantine.		Farms cleared by Slaughter.		Farms where Fencing has been ordered.		Farms where Tanks have been ordered.	
	1914–15	1915–16	1914–15	1915–16	1914–15	1915–16	1914–15	1915–16	1914–15	1915–16	1914–15	1915–16
TRANSVAAL :—	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Barberton	20	26	20	21	nil	2	nil	nil	2	2	7	4
Pietersburg	7	9	3	7	6	5	,,	1	nil	2	3	4
Carolina	1	8	1	7	1	nil	,,	nil	,,	nil	nil	3
Piet Retief	12	5	5	2	10	16	,,	,,	6	3	10	14
Zoutpansberg	1	2	1	2	1	nil	,,	,,	nil	nil	2	1
Ermelo	nil	1	nil	1	nil	,,	,,	,,	,,	,,	nil	2
Lydenburg	,,	1	,,	1	,,	,,	,,	,,	,,	,,	,,	nil
Totals ..	41	52	30	41	18	23	nil	1	8	7	22	28
CAPE (exclusive of Transkeian Territories) :—												
East London	12	1	nil	nil	18	11	nil	nil	nil	nil	nil	nil
Elliot	10	5	1	,,	nil	5	,,	,,	,,	,,	,,	,,
King Williamstown ..	3	nil	nil	,,	4	3	,,	,,	,,	,,	,,	,,
Komgha	nil	2	,,	2	nil	nil	,,	,,	,,	,,	,,	,,
Maclear	5	nil	,,	nil	,,	5	,,	,,	,,	,,	,,	,,
Totals ..	30	8	1	2	22	24	nil	nil	nil	nil	nil	nil
TRANSKEIAN TERRITORIES :												
Bizana	*	*	*	nil	nil	nil	nil	nil	nil	nil	nil	nil
Butterworth	41	§	4	,,	,,	,,	,,	,,	,,	,,	,,	,,
Elliotdale	*	*	*	,,	,,	,,	,,	,,	,,	,,	,,	9
Engcobo	*	*	*	,,	,,	,,	,,	,,	,,	,,	,,	9
Flagstaff	*	*	*	,,	,,	,,	,,	,,	,,	,,	,,	nil
Idutywa	*	*	*	,,	,,	,,	,,	,,	,,	,,	,,	,,
Kentani	*	*	23	2	,,	,,	,,	,,	,,	,,	,,	,,
Libode	*	*	*	nil	,,	,,	,,	,,	,,	,,	,,	,,
Lusikisiki	*	*	*	,,	,,	,,	,,	,,	,,	,,	,,	8
Matatiele	2†	3	1†	3	,,	2	,,	,,	,,	3	15	8
Mount Ayliff	*	*	*	nil	,,	nil	,,	,,	,,	nil	nil	nil
Mount Currie	5	nil	1	,,	11	4	,,	,,	,,	,,	2	12
Mount Fletcher ..	5	7	4	2	nil	1	,,	,,	,,	,,	nil	nil
Mount Frere	‡	††	2	2	,,	nil	,,	,,	,,	,,	,,	,,
Mqanduli	*	*	*	nil	,,	,,	,,	,,	,,	,,	,,	9
Ngqeleni	*	*	*	,,	,,	,,	,,	,,	,,	,,	,,	nil
Nqamakwe	16	11	13	11	4	11	,,	,,	,,	,,	,,	1
Port St. John's ..	*	23	*	nil	nil	nil	,,	,,	,,	,,	,,	nil
Qumbu	*	*	*	,,	,,	,,	,,	,,	,,	,,	,,	,,
St. Mark's	17	17	2	1	,,	,,	,,	,,	,,	,,	,,	,,
Tabankulu	*	*	*	nil	,,	,,	,,	,,	,,	,,	,,	,,
Tsolo	*	*	1	,,	,,	,,	,,	,,	,,	,,	,,	1
Tsomo	10	16	8	5	,,	4	,,	,,	,,	,,	,,	1
Umtata	*	‡‡	**	nil	,,	nil	,,	,,	,,	,,	,,	1
Umzimkulu	75	48	nil	2	49	4	,,	,,	,,	,,	12	18
Willowvale	*	*	*	nil	nil	nil	,,	,,	,,	,,	nil	1
Xalanga	1	nil	1	,,	1	,,	,,	,,	,,	,,	,,	2
Totals ..	172	125	60	28	65	26	...	...	...	3	29	78
NATAL :—												
Alexandra	14	4	1	1	34	9	nil	nil	nil	nil	1	nil
Alfred	17	2	2	2	26	6	,,	,,	,,	,,	nil	,,
Lower Umzimkulu ..	10	nil	2	4	11	2	,,	,,	,,	,,	,,	,,
Camperdown	1	1	1	4	7	nil	,,	,,	,,	,,	,,	,,
New Hanover	1	nil	1	7	5	,,	,,	,,	,,	,,	,,	4
Umvoti	2	,,	nil	1	3	2	,,	,,	,,	,,	,,	nil
Kranskop	1	1	,,	nil	4	nil	,,	,,	,,	,,	,,	,,
Richmond	6	nil	1	,,	5	6	,,	,,	,,	,,	,,	,,
Umgeni	12	,,	2	8	3	4	,,	,,	,,	,,	,,	,,
Impendhle	8	,,	nil	1	9	7	,,	,,	,,	,,	,,	,,
Durban	nil	,,	,,	nil	nil	nil	,,	,,	,,	,,	,,	,,
Lower Tugela	4	,,	3	,,	,,	1	,,	,,	,,	,,	1	1
Mapumulo	1	,,	1	,,	,,	nil	,,	,,	,,	,,	nil	nil
Inanda	nil	,,	nil	,,	2	,,	,,	,,	,,	,,	,,	,,
Polela & Underberg§§ ..	9	2	1	2	25	2	,,	,,	,,	,,	,,	,,
Ixopo	44	10	3	13	8	18	,,	,,	,,	,,	1	7
Dundee	1	nil	nil	1	6	1	,,	,,	,,	,,	nil	nil
Helpmakaar	2	,,	2	nil	1	1	,,	,,	,,	,,	,,	3
Vryheid (12 farms) ..	12	1	5	7	17	6	,,	,,	,,	,,	9	13
Babanango (8 farms)..	8	nil	4	11	2	2	,,	,,	,,	,,	1	14
Ngotshe (28 farms) ..	28	9	4	10	nil	15	,,	,,	,,	,,	2	26
Paulpietersburg ..	6	nil	nil	nil	7	6	,,	,,	,,	,,	nil	nil
Nqutu	1	,,	,,	,,	nil	1	,,	,,	,,	,,	,,	,,
Nkandhla	1	,,	,,	,,	1	nil	,,	,,	,,	,,	,,	,,
Newcastle	4	,,	,,	,,	15	4	,,	,,	,,	,,	2	,,
Utrecht	3	1	,,	3	9	2	,,	,,	,,	,,	1	3
Eshowe	4	1	1	1	1	3	,,	,,	,,	,,	nil	nil
Mtunzini	9	nil	nil	1	3	8	,,	,,	,,	,,	,,	,,
Emtonjaneni	2	,,	,,	nil	2	2	,,	,,	,,	,,	,,	,,
Lower Umfolozi ..	2	,,	,,	,,	nil	3	,,	,,	,,	,,	,,	,,
Klip River	21	7	,,	9	26	7	,,	,,	,,	,,	,,	11
Bergville	37	4	1	nil	13	23	,,	,,	,,	,,	1	nil
Estcourt	6	nil	nil	2	8	6	,,	,,	,,	,,	nil	,,
Weenen	9	6	2	1	2	2	,,	,,	,,	,,	3	2
Lion's River	3	nil	nil	2	1	3	,,	,,	,,	,,	nil	1
Totals ..	289	49	37	91	256	152	nil	nil	nil	nil	22	85

* Whole district. ** Whole district; a few farms in Settlement have had no fresh cases of disease. † Suspect. ‡ Whole district all but 2. § 3 farms and all locations. †† 31 locations. ‡‡ All locations and 5 farms. §§ One of these involves 5 lots.

ANNEXURE 2.—RETURN OF LIVESTOCK IMPORTED INTO THE UNION FROM OVERSEA THROUGH THE PORTS OF CAPE TOWN, PORT ELIZABETH, EAST LONDON AND DURBAN DURING THE YEAR ENDED 31ST MARCH, 1916.

	Cattle.	Horses.	Mules.	Donkeys.	Sheep & Goats.	Pigs.	Dogs.	Cats.	Zoological Specimens.	Totals.
Cape Town ..	157	204	863	20	24	9	36	—	—	1,313
Port Elizabeth	20	—	—	—	13	—	28	8	—	69
East London	55	1	—	—	16	2	6	—	—	80
Durban ..	109	67	—	7	721	18	36	2	4	964
Totals 1915-16	341	272	863	27	774	29	106	10	4	2,426

ANNEXURE 2A.—STATEMENT SHOWING THE BREED AND SEX OF ANIMALS IMPORTED FROM OVERSEA.

HORSES.	Stallions.	Mares.	Geldings.	PIGS.	Boars.	Sows.	DONKEYS.	Jacks.	Jennies.
Thoroughbred	68	69	29	Berkshire	6	17	Catalonian	14	6
Clydesdales	1	—	—	Large Black	1	—	Miscellaneous	7	—
Hackneys ..	1	—	—	Tamworth	—	2			
Ponies ..	1	—	2						
Miscellaneous	—	—	—	3 young Berkshires					
Quagga, Circus, &c.	4	32	6						

59 Thoroughbreds whose sexes are unrecorded.

CATTLE.	Males.	Females.	SHEEP.	Rams.	Ewes.
Shorthorn	83	102	Waganella	4	—
Aberdeen Angus	20	16	Romney Marsh ..	12	5
North Devons	4	—	Merino	329	325
South Devons	12	22	Leicester	15	6
British Holstein	—	4	Suffolk	2	2
Herefords	16	15	Lincoln	5	21
Jersey	—	7	Cheviot	1	—
Sussex	6	3	South Down	2	—
Ayrshire	2	16	Shropshire	2	—
Lincoln Red	7	—	Corriedel 5	sex unrecorded.	
Red Poll	2	—			
Longhorn	2	—			

2 calves, sex unrecorded.

4 sheep. No pedigree or sex recorded.
Lambs: Merino, 32; Shropshire, 2.

ANNEXURE 3.—RETURN OF CATTLE DIPPING TANKS. 1915-16.

Province.	No. in Existence.	No. in course of Construction.
Cape Province	1,409	2
Transvaal	717	21
Natal	2,557	34
Transkei	656	14
Orange Free State	128	14

ANNEXURE 4.—COMPARATIVE RETURN OF OUTBREAKS OF PROCLAIMED DISEASES. 1914-15 1915-16.

Disease.	Cape.		Transvaal.		Natal.		Transkei.		Orange Free State.	
	1914 1915	1915 1916	1914 1915	1915 1916	1914 1915	1915 1916	1914 1915	1915 1916	1914 1915	1915 1916
East Coast Fever	3	2	73	91	37	—	58	31	—	—
Tuberculosis										
Outbreaks	—	—	36	13	5	6	2	2	6	2
Isolated, died or destroyed ..	174	104	88	28	55	114	—	6	8	1
In-contacts tested	2,878	4,032	535	425	1,260	1,006	—	125	410	—
Anthrax :										
Outbreaks	467	346	529	688	24	34	83	52	78	88
Died	938	493	1,365	1,100	59	211	194	100	235	548
In-contacts dealt with	7,569	4,768	28,587	27,500	2,629	5,379	1,415	9,383	6,047	12,763
Glanders :										
Outbreaks	23	22	27	63	3	9	12	5	5	6
Died or destroyed	73	67	51	141	21	18	15	7	18	109
In-contacts tested	357	212	431	1,537	97	734	124	148	2,308	801
Lungsickness :										
Outbreaks	7	2	—	1	—	—	10	2	—	—
Died or destroyed	13	3	—	2	—	—	15	3	—	—
In-contacts dealt with	940	1,232	—	—	—	—	756	—	—	—
Equine Scabies :										
Outbreaks	70	76	2	5	5	11	12	14	1	4
Died or destroyed	12	37	—	1	—	8	—	21	—	7
Under observation or treated ..	159	200	—	—	67	53	81	—	3	4
Epizootic Lymphangitis :										
Outbreaks	1	4	1	1	11	5	—	—	—	—
Died or destroyed	1	5	1	1	21	3	—	—	—	—
Treated	—	—	—	—	19	1	—	—	—	—
Contagious Abortion :										
Outbreaks	2	—	10	8	2	10	3	8	5	5
Infected	18	—	67	25	10	61	5	22	19	38

ANNEXURE 5.—PROFESSIONAL STAFF OF VETERINARY DIVISION, 1915-16.

Name.	Title.	Station.
Transvaal Province.		
J. Spreull	Senior Veterinary Officer	Pretoria.
P. Conacher	Government Veterinary Officer	Johannesburg.
J. Chalmers	,, ,, ,,	Piet Retief.
J. Edgar	,, ,, ,,	Pietersburg.
R. S. Garraway	,, ,, ,,	Pretoria.
G. May	,, ,, ,,	Carolina.
G. F. Marais	,, ,, ,,	Volksrust
W. Jones	,, ,, ,,	Mafeking.
A. Goule	,, ,, ,,	Rustenburg.
J. G. Bush	,, ,, ,,	Seconded to Defence Dept.
F. J. Dunning	,, ,, ,,	,, ,, ,,
G. Lee	,, ,, ,,	,, ,, ,,
G. McCall	,, ,, ,,	,, ,, ,,
H. M. Webb	,, ,, ,,	,, ,, ,,
G. C. Webster	,, ,, ,,	,, ,, ,
M. Cunningham	,, ,, ,,	,, ,, ,
Cape Province.		
R. W. Dixon	Senior Veterinary Officer	Cape Town.
W. A. Simson	Government Veterinary Officer	Queenstown.
G. Fern	,, ,, ,,	Cape Town.
A. C. Kirkpatrick	,, ,, ,,	East London.
A. Matthew	,, ,, ,,	Port Elizabeth.
W. P. Hamlyn	,, ,, ,,	Komgha.
G. T. Henderson	,, ,, ,,	Elliot.
B. van der Vyver	,, ,, ,,	Cradock.
H. H. Curson	,, ,, ,,	Cape Town.
W. G. Pakeman	,, ,, ,,	Aliwal North.
J. H. L. Lyons	,, ,, ,,	Seconded to Defence Dept.
A. Goodall	,, ,, ,,	,, ,, ,,
Natal Province.		
W. M. Power	Senior Veterinary Officer	Maritzburg.
C. H. Wadlow	Government Veterinary Officer	Maritzburg.
F. M. Hill	,, ,, ,,	Ladysmith.
J. L. Webb	,, ,, ,,	Stuartstown.
F. Hutchinson	,, ,, ,,	Dundee.
S. H. Ewing	,, ,, ,,	Eshowe.
A. F. Harber	,, ,, ,,	Mooi River.
T. H. Dale	,, ,, ,,	Durban.
C. Tyler	,, ,, ,,	Port Shepstone.
S. I. Johnston	,, ,, ,,	Seconded to Defence Dept.
Orange Free State.		
A. Grist	Senior Veterinary Officer	Bloemfontein
J. R. R. Hamilton	Government Veterinary Officer	Bloemfontein.
E. T. Clemow	,, ,, ,,	Seconded to Defence Dept.
F. M. Skues	,, ,, ,,	,, ,, ,,
J. F. Joyce	,, ,, ,,	,, ,, ,,
Transkei.		
G. W. Freer	Senior Veterinary Officer	Umtata.
G. H. Melck	Government Veterinary Officer	Umtata.
R. Paine	,, ,, ,,	Kokstad.
J. J. Keppel	,, ,, ,,	On active service in Europe.
W. A. Dykins	,, ,, ,,	Seconded to Defence Dept.
A. E. Howie	,, ,, ,,	,, ,, ,,

ANNEXURE 6.—RETURN OF IMPORTED CATTLE TESTED DURING THE YEAR ENDED 31ST MARCH, 1916.

Imported from	Tested.	Number of Animals	
		Reacted.	Percentage.
Great Britain	234	17	7·2

Note.—Out of 341 cattle imported only 234 were tested during the year under review, the balance of 107 being accounted for by cattle proceeding direct to Rhodesia, and cattle landed in March being tested in April.

APPENDIX II.

DIVISION OF SHEEP.

ANNUAL REPORT, 1915-16.

In submitting my report of the work performed by the Division of Sheep during 1915, I have divided it into two sections—the first dealing with the eradication of Scab, and the second with the progress in sheep and wool.

ADMINISTRATION.

The following field officers have been employed to administer the Act during the year under review, viz.:—25 Senior Inspectors, 388 Area Inspectors, 10 Itinerant Inspectors.

During the year 6 Inspectors resigned, 3 were dismissed, 24 were superannuated, and 3 (including 1 Senior Inspector) died.

Of the 25 Senior Inspectors 16 control areas in the Cape Province, 3 in the Orange Free State, 4 in the Transvaal, and 2 in Natal.

The area Inspectors are divided as follows, viz.:—214 in the Cape, 87 in the Transvaal, 57 in the Orange Free State, and 30 in Natal and Zululand.

APPOINTMENTS.

Before an Inspector is appointed he is required to undergo a course of instruction in detecting Scab, and in microscopic training either at the Johannesburg or Maitland Abattoirs. The need for increasing the number of Inspectors is felt, as a number of areas are too large to be effectively controlled by one Inspector. For financial reasons, however, it has not been possible to make fresh appointments.

LEGISLATION.

No further amendments have been made since the amended Scab Regulations came into force on the 1st August, 1914. These Regulations have now been given a thorough trial, and with the exception of minor defects in the legal phraseology, which came to light in defended cases, have been found very satisfactory. The sections thus adversely affected will be altered in the near future.

MOVEMENTS OF STOCK.

To check effectively the movements of infected stock remains a difficult problem. During the summer, when sheep are in good condition, and there is no lack of grass or water, infected flocks can be detained anywhere, until they have been thoroughly cleansed. The difficulty arises when grass or water fails, and when the condition of the stock is so low, that the inspector fears to enforce dipping, on account of loss that may result. In such a contingency the lesser of two evils has to be decided upon, and the owner, after having stated his destination, as well as full further particulars, to the Senior Inspector or Head Office, is, as a rule, given a permit to trek to better grazing, and is instructed to dip the visibly infected animals from day to day as scab makes its appearance. The Inspector who issues this permit immediately notifies the Inspector of the area to which the stock is being removed. Upon arrival at their destination they are quarantined, and dipped under supervision of the area Inspector as soon as their condition has so improved that dipping can be administered without fear of loss.

It has been customary to appoint Inspectors to control the movement of stock on trek from summer to winter grazing and *vice versa*. However, on account of the unsettled state of the country, and in order to economise, this has not been done during the current year. Inspectors on the main trek roads were, however, instructed to spend as much of their time on these roads, and to examine as many trek flocks as possible.

Three Inspectors are stationed at the Johannesburg and two at the Maitland Abattoirs. Infected stock are immediately quarantined on arrival, and not allowed to leave the Abattoirs alive.

In this connection it may be stated that an Inspector is badly needed at the Pretoria Abattoirs. The following is a comparative return of number of sheep and goats received and quarantined at Johannesburg.

	No. of Sheep and Goats.	Infected Stock.	Percentage.
1911	717,545	81,891	11·41
1912	801,075	77,970	9·73
1913	791,962	57,489	7·25
1914	774,794	25,427	4·57
1915	738,058	49,335	6·68

INTRODUCTION OF SMALL STOCK INTO THE UNION.

Stock from adjacent territories can only enter the Union through proclaimed Ports of Entry, after they have been twice dipped under the supervision of a Border Supervisor. For the present no stock are allowed to enter from the South-West Protectorate. The Port of Entry from Bechuanaland Protectorate is at Ramathlabama. Basutoland has 9 Ports of Entry: One into Natal, two into the Cape Province, and six into the Orange Free State. For financial reasons the Border Supervisors were retrenched, and the Inspectors of the adjoining areas were instructed to control the entry of stock through these ports. Numerous complaints have been made by Inspectors whose areas adjoin Basutoland, of the negligence of native owners in allowing their stock to stray across the border. This matter has often been brought to the notice of the Basutoland authorities, with a view to inducing them to introduce scab legislation in that territory. Thus far, however, no steps in that direction have been taken. The reply received was to the effect that border farmers on the Union side could prevent stray stock from trespassing by fencing their boundaries, and that the Basutoland authorities were prepared to pay half the expense of the fence.

EFFECTS OF DIP ON WOOL.

On account of the European War it is regretted that the report from Leeds on the parcels of wool dipped in various dips has not yet been received. A report on the samples sent to Bradford has been furnished.

DIPPING TANKS.

The number of dipping tanks provided in 1915 was: Cape Province, 562; Natal, 245; Orange Free State, 167; Transvaal, 239. This number is not as large as it should have been. It is gratifying to state that in the Northern Transvaal native headmen have been exerting themselves, and collected money from the natives under their control for the purpose of purchasing tanks for their locations. One of the cement factories has constructed complete circular tanks, composed of blocks of re-inforced concrete, which are numbered, and can be fitted together at the place where such a tank is to be erected. A number of these tanks have already been disposed of, especially to natives, who usually have no knowledge of the manner in which a tank is to be constructed. In the Transkeian Territories a number of tanks have been constructed by the General Council.

DIPPING AND DIPPING MATERIALS.

The apathy to dipping formerly shown by various stock-owners is gradually disappearing. There is no doubt that the existence of scab to-day in the Union is largely due to improper mixing of dip and insufficient immersion of the animal dipped. It has frequently happened that a farmer has accused an Inspector of keeping his animals too long in the tank, when the latter timed his dipping by his two-minute sand-glass.

Under Section 10 of the Regulations an Inspector has the right to take over any infected flock, and to administer both dippings under his personal supervision. This section specially affects the careless and negligent owner, and is of very great assistance to the Inspector, who conscientiously does all in his power to clean his area.

With regard to dips an owner is at liberty to use whichever dip he pleases, but when sheep are dipped under the personal supervision of an Inspector lime and sulphur or caustic soda and sulphur are used whenever possible. In parts remote from the railway it often happens that the latter dipping ingredients cannot be obtained; in such a contingency the Inspector is obliged to use whatever brand of dip he is able to procure.

COMPENSATION FOR LOSS OF STOCK THROUGH DIPPING.

This amounted to £116 4s. 6d., paid to four owners in all.

NUMBER AND PERCENTAGE OF INFECTED STOCK.

The following statement "A" gives at a glance the total number of sheep (woolled and crossbred) and goats (Angora and others) in the Union on December 31st, 1915. Statement "B" gives the number and percentage of infected animals on that date, as well as the number lost through drought during the year.

"A." NUMBER OF STOCK IN UNION ON 31/12/15.

Province.	Flocks.	Sheep.		Goats.		Total Sheep and Goats.
		Woolled.	Crossbred and others.	Angoras.	Others.	
Cape	130,834	12,372,344	3,886,782	2,396,834	3,567,234	22,223,194
Transvaal	44,136	3,467,206	811,786	122,400	1,233,338	5,634,730
Orange Free State ..	25,310	8,166,143	385,672	246,166	163,818	8,961,799
Natal	41,167	1,938,113	406,034	79,105	1,109,377	3,532,629
Grand Total for Union	241,447	25,943,806	5,490,274	2,844,505	6,073,767	40,352,352

"B."—INFECTED STOCK AS AT 31/12/15.

Province.	Flocks.	Sheep and Goats.	Percentage infected flocks.	Percentage infected stock.	No. lost through drought.
Cape	1,393	408,900	1·06	1·84	2,514,769
Transvaal	1,222	168,744	2·77	2·99	87,674
Orange Free State ..	584	289,128	2·31	3·23	352,941
Natal	263	90,692	·64	2·57	20,621
Grand Total, Union..	3,462	957,464	1·43	2·37	2,976,005

"C." PERCENTAGE OF INFECTION IN DISTRICTS AS AT 31/12/15.

Province.	Free from Scab.	Infected under 1 %.	Infected under 2 %.	Infected under 3 %.	Infected under 4 %.	Infected over 4 %.
Cape	27	35	25	9	6	12
Transvaal	Nil	7	3	4	4	4
Orange Free State ..	Nil	7	3	6	1	7
Natal	10	3	11	4	3	3
Total No., Union ..	37	52	42	23	14	26

SHEEP AND WOOL.

During the year under review, the two Seniors, and the ten Sheep and Wool Experts under their control, rendered valuable service to the public in classing flocks, organising studs, passing sheep for the Stud Book, selecting rams, lecturing, demonstrating, judging at Agricultural Shows, and giving advice on the sheep industry generally. Roughly 379,500 sheep were handled, and 346 lectures and demonstrations given during the year.

The year was not a normal one. Political upheavals and consequent active service depleted the staff considerably. Another setback was the almost unprecedented drought in certain parts of the Union, and the fact that generally speaking the flocks had not quite recovered from the ravages of the epidemic of blue tongue the year before. This is particularly noticeable in fourtooth sheep, which appear to be smaller and poorer than usual—just those sheep that in their growing period suffered from this disease and the drought.

However, in spite of these drawbacks interest in sheep-farming has been more than kept up; thanks to the unusually good prices obtained for wool during this period.

PROSPECTS OF SHEEP INDUSTRY.

The reports of the experts speak very encouragingly of the possibilities, prospects and actual advancement achieved in the industry generally.

As evidence of this advancement it is most encouraging to note:—

- (*a*) Ever increasing demand for services of experts—more applications have been received than experts were able to cope with.
- (*b*) Large number of studs placed voluntarily under control of Government experts. Practically all leading studs are relying on energies of these officers to maintain their standard and advancement.

(*c*) Steady decline in number of bastards and allied types of sheep and types of merinoes giving short, heavy-conditioned wool.

(*d*) The fact that South African Stud Breeders' Association are making use of services of all experts to pass animals for Stud Book.

(*e*) That, with one exception, leading Agricultural Societies not only avail themselves of experts as judges, but very often approach them for advice on subjects relating to their work.

(*f*) That in almost every case where wool growers obtained excellent prices for their clip the improvement of the flock can be traced directly to the work of one or other of the experts.

These facts show progress of industry, and that the endeavour of Government to assist sheep farmers in the right direction is being appreciated and bearing fruit.

The year under review has shown the staff of experts to be altogether inadequate to cope with demand for their services.

Mr. Mallinson, Senior Sheep and Wool Expert for the northern half of the Union, returned from Australia at expiration of his leave, and resumed duty in October.

PRICE OF WOOL.

There has been a consistent upward tendency in the price of all classes of wool. The price of merino (grease) wool obtained on the London market at the close of 1915 ranged from 6d. to 16½d., and at the Coast Ports from 5d. to 16d. per lb., according to quality. The better the line, and the lighter and longer, the more rapid the rise has been. Prior to the European War the Belgian and German demand for those qualities of wool made the shorter and finer wools more valuable than the lower line of long or combing wools. Now the reverse is taking place, and the price of longer stapled wools has increased more in proportion than "clothing" wools. The effect hereof on the Union is most healthy, encouraging the breeding of larger, stronger sheep of better staple, and bringing home to the farmer the undesirability of breeding the short, greasy, smaller-framed sheep.

IMPORT AND EXPORT OF MUTTON.

The following statement is interesting, showing decrease in import and increase in export of mutton during the past 5 years.

Year.	1911.	1912.	1913.	1914.	1915.
Export of Mutton:					
Weight in lbs.	60,909	128,686	26,382	107,963	319,897
Value in £	1,308	2,577	619	2,266	7,516
Import of Mutton:					
Weight in lbs.	3,463,899	2,641,790	2,114,384	781,675	8,881
Value in £	32,308	25,450	24,448	11,065	238

CONCLUSION.

Notwithstanding the increase in the number of infected stock during the early part of the year, caused through the Rebellion, and the absence on active service of a number of Inspectors, scab eradication has progressed satisfactorily.

The decrease in the number of small stock, due mainly to the terrible drought and severe blue tongue, is regretted.

It is desired to express appreciation of the assistance rendered this Division by other Departments of State, and of the loyal support of the field officers, who by their energy and tact have to a great extent removed the antipathy that formerly existed against them, and made co-operation, which is so indispensable between the stock-owner and Inspector possible; also to the clerical staff, who, notwithstanding a considerable decrease in their number, managed to keep up current work, by sacrificing many an hour of their spare time to official duties.

A comparative statement showing the export of wool, mohair and skins for the years 1912, 1913, 1914, and 1915, is attached.

J. F. JORDAAN,
Acting Chief, Division of Sheep.

ANNEXURE.—COMPARATIVE STATEMENT OF EXPORT OF WOOL, MOHAIR AND SKINS FOR THE YEARS 1912, 1913, 1914 and 1915.

		Weight.	Value.	Average value per lb.	Number of Woolled Sheep.	Average weight of wool per sheep.	Average income per sheep.
		lbs.	£	d.	No.	lbs.	s. d.
1912.	Wool Washed	48,882	2,850	14·0	27,331,167	5·92	3 5·91
	Wool Scoured	4,164,332	250,645	14·4			
	Wool Grease	157,761,470	4,527,099	6·8			
	Total ..	161,974,684	4,780,594	—	—	—	—
	Mohair	23,479,729	967,286	—	—	—	—
	Sheep Skins ..	29,029,147	724,196	—	—	—	—
	Goat Skins ..	8,126,360	291,695	—	—	—	—
1913.	Wool Washed	70,850	4,832	16·4	28,327,907	6·24	4 0·45
	Wool Scoured	3,658,260	269,932	17·7			
	Wool Grease	173,242,755	5,444,524	7·5			
	Total ..	176,971,865	5,719,288	—	—	—	—
	Mohair	17,355,882	876,255	—	—	—	—
	Sheep Skins ..	32,196,400	889,611	—	—	—	—
	Goat Skins ..	9,104,691	325,936	—	—	—	—
1914.	Wool Washed	134,305	9,575	17·1	No statistics	—	—
	Wool Scoured	4,323,215	328,073	18·2			
	Wool Grease	129,523,797	3,900,557	7·2			
	Total ..	133,981,317	4,238,205	—	—	—	—
	Mohair	18,865,743	834,202	—	—	—	—
	Sheep Skins ..	30,353,731	753,273	—	—	—	—
	Goat Skins ..	7,941,096	270,170	—	—	—	—
1915.	Wool Washed	87,251	7,926	21·8	25,943,806	6·55	4 1·76
	Wool Scoured	8,662,792	618,903	17·1			
	Wool Grease	161,253,130	4,753,202	7·1			
	Total ..	170,003,173	5,380,031	—	—	—	—
	Mohair	16,304,378	687,635	—	—	—	—
	Sheep Skins ..	37,226,422	827,590	—	—	—	—
	Goat Skins ..	8,304,792	264,875	—	—	—	—

Total Value Export of Wool, Mohair and Skins:
In 1912, £6,763,771; 1913, £7,811,090; 1914, £6,095,850; 1915, £7,160,131.

APPENDIX III.

VETERINARY RESEARCH.

ANNUAL REPORT OF DIRECTOR, 1915-16.

ROUTINE WORK.

1. *Microscopical and Pathological Anatomical Examinations.*—The number of specimens and smears examined at the three Laboratories amounted to 15,030, *viz.*: 9,654 in Onderstepoort, 627 in Grahamstown, and 4,749 in Pietermaritzburg. At Onderstepoort a positive diagnosis was arrived at in 2,042 cases, the following being the principal items:—

391 cases of East Coast fever or complications, representing 4 per cent. of the total number examined.
132 cases of Redwater, or complications, representing 1·4 per cent. of the total number examined.
372 cases of Anaemia (a probable sequel of Redwater or Anaplasmosis), representing 4 per cent. of the total number examined.
124 cases of Anaplasmosis (Anaplasma marginale, Gallsickness), and complications, representing 1·3 per cent. of the total number examined.
924 cases of Anthrax, representing 9 per cent. of the total number examined.

1,016 smears were too decomposed for diagnosis, leaving the number of negative results at 6,597, or 68 per cent. of the total. In other words it means that in 68 per cent. of all cases submitted we cannot make any diagnosis, and at the present time we have no means of doing so. As I pointed out in my last report such cases offer an opportunity for further research to find out the cause and the nature of the responsible disease, but as they are not of a contagious or infectious nature there is little possibility of studying them at the Laboratory. Field investigations would be necessary, but cannot be undertaken with the limited staff at my disposal.

2. *Blue Tongue Vaccine.*—1,971,180 doses were issued during the year, the revenue amounting to £8,213 5s. The issue of this vaccine was more than double that supplied last year (928,056 doses), and brings the total number of issues since the vaccine was first prepared in 1907 to 5,616,539 doses.

In addition to the exceptionally heavy demands that were made on my staff to cope with the increased requirements of the farming population our difficulties were further accentuated through the lack of bottles and packing materials, and the scarcity of sheep required for vaccine preparation.

Two slight mishaps occurred during the season, one in the Orange Free State and the other in Vryheid district. In both cases some sheep died after vaccination, and from the evidence collected it seemed probable that the vaccine itself was responsible, the actual cause no doubt being incomplete sterilisation of bottles.

Although all vaccines are issued without any guarantee, I considered it advisable to recommend payment of compensation to the owners concerned, and my recommendations were adopted.

3. *Redwater and Gallsickness Vaccine.*—The issues of the vaccine from the various Laboratories were as follows:—

Pretoria, 3,921 doses.
Grahamstown, 5,327 doses.
Pietermaritzburg, 2,064 doses; total 11,312 doses.
No unsatisfactory reports were received.

4. *Anthrax Vaccine.*—The demands for this vaccine showed an extremely heavy increase on previous years' requirements, so much so in fact that the Institute Pasteur in Paris from which all supplies were obtained previously could not keep pace with our requisitions.

The necessity for preparing Anthrax vaccine in the Laboratories at Onderstepoort had become more evident year by year, and as it was recently found possible to overcome certain technical difficulties that had hitherto stood in the way, preparations were made for the erection of suitable isolated buildings so that this work could be added to the routine duties of the Division. Temporary arrangements were made in the meantime; between November, 1915, and March, 1916, 150,250 doses were prepared locally. In addition to this quantity 249,430 doses obtained from the Pasteur Institute were supplied during the year, bringing up the total output for 1915-16 to 399,680 doses. The issues for the previous year were 190,605 doses.

5. *Black Quarter Vaccine.*—185,830 doses were prepared and issued from Onderstepoort during 1915-16 as compared with 154,910 doses supplied during the preceding 12 months.

6. *Inoculation of Mules against Horse-sickness.*—During the period under review 1,091 mules were inoculated in the Union with a mortality of 20 or 1·8 per cent. The mortality from inoculation has shown a slight decrease during the past few years, and with our present knowledge it should be possible to keep the loss below 3 per cent.

7. *Agglutination Tests for Contagious Abortion and Glanders.*—The agglutination tests for Contagious Abortion and Glanders as additional routine duties of the Division have been made use of by the Veterinary Department, especially in connection with Contagious Abortion when endeavouring to assist stock-owners to separate their herds into healthy and infected animals.

During the financial year 1915-16, 1,180 individual tests were undertaken, the positive results amounting to 15 per cent. of the total.

For Glanders, the test is chiefly used for controlling doubtful mallein reactions, and only about 100 tests have been undertaken.

8. *Correspondence.*—Again an appreciable increase in correspondence has to be recorded, the total incoming and outgoing letters and telegrams for the year under review numbering 48,263 as compared with 41,518 during the previous 12 months. The detailed figures are as follows:—

	Onderstepoort.		Grahamstown.		Pietermaritzburg.	
Letters and telegrams received ..	18,877		2,232		4,437	
Letters and telegrams despatched ..	18,622		1,555		2,540	
Total	——	37,499	——	3,787	——	6,977

9. *Staff.*—I have again to express my appreciation of the services rendered by my staff during a period of constant disorganisation and at a time when routine duties were exceptionally heavy. The officers who had been on Active Service in South West Africa returned to duty soon after the commencement of the new financial year, and several of them were released later for service in East Africa and Oversea.

Research Work.

Generally speaking the year has been conspicuous by an enormous increase in the routine work, the natural result of which was a corresponding diminution of research. The lack of opportunity for research work was further accentuated by the absence for some months of several members of the staff on Active Service, amongst whom were two of my seven Veterinary Research Officers.

The two main subjects of investigations were Lamziekte in cattle, and Horse-sickness, and I have dealt with these matters more fully.

1. *Lamziekte in Cattle.*—The investigations into Lamziekte are still being carried on at Armoedsvlakte, Vryburg, under the supervision of Mr. Viljoen. The initial object was to verify and control the results of investigations published by Professor Hedinger, with particular reference to the opinion expressed by him that Sarcosporidia were the cause of Lamziekte. At the outset this task seemed almost impossible of solution owing to the lack of information concerning the life history of these parasites, and although many other investigators had attempted to settle this question their efforts had not met with success. Under these circumstances I decided to continue investigations on the lines adopted by Professor Hedinger, but in addition to extend them so as to include the examination of material obtained from cattle that died on Armoedsvlakte from any cause whatever. In this way the examination of sections cut from muscles of different animals enabled me to compare the number of Sarcosporidia and the extent of the pathological lesions they caused in the cattle that died of Lamziekte and in those that died from other causes. The net result is that Sarcosporidia are found in all cattle, particularly in cattle in poor condition, and this latter fact was so obvious that we came to the conclusion that Sarcosporidia may be the cause of an illness, or anyway a cause of poverty, but not a cause of Lamziekte. This conclusion is supported by the fact that pathological lesions found in cattle showing a large number of Sarcosporidia are in no way associated with the lesions found in cattle that die of Lamziekte. Finally in Lamziekte animals a minimum number of parasites are found with a maximum of pathological changes indicating that the latter cannot be caused by Sarcosporidia. Accordingly, although investigations into relationship of Sarcosporidia to disease will still be continued, the one conclusion arrived at so far is that these parasites have no connection with Lamziekte.

Accordingly I have had to return to the grass toxin theory, which still offers a better explanation for the cause of Lamziekte than any other, and using this theory as the basis for further research a new programme was planned and is now in course of operation. It is of interest to note that the disease has been located in a 12-acre paddock at Armoedsvlakte, and a thorough botanical survey has been undertaken by Mr. Pole Evans, with whose assistance feeding tests with plants (both infected and free from fungi) are now being undertaken.

It had been my intention to lay out an artificial grazing ground at Armoedsvlakte to see whether Lamziekte would still be contracted by cattle grazing on such a pasturage, but the ground proved unsuitable for ploughing, and I therefore decided to undertake this work at Bestersput, near Bloemfontein. All the necessary arrangements have been made there and cattle transferred in readiness but no disease has appeared so far. A new experiment has been planned and partially carried out by removing soil from a Lamziekte to a non-Lamziekte area with the object of seeing whether the disease can be transferred.

A number of possible preventive and curative measures have been attempted including injections of Trypanblue, Methylene Blue, Chloral Hydrate, Formalin, etc., but without success.

2. *Imapunga in Cattle.*—This disease of the Eastern Province is under investigation by Mr. Wm. Roberston of the Grahamstown Laboratory. Sixty head of cattle have been exposed on the farm Palmerston and preparations made for inoculation and drenching experiments in the Laboratory. No disease has appeared so far amongst the exposed cattle.

3. *Contagious Abortion in Cattle.*—The object of these experiments was of a practical nature, based on enquiries made by various correspondents, and can be summarised as: (1) To see whether clean cows can become infected by a bull which has previously served cows that have aborted but have been isolated for at least 18 months and not allowed to be served. (2) To see whether it is possible by means of serum tests at intervals of two months to separate the infected cows from a herd in such a manner that the clean ones remain clean and no further positive reactions are obtained. (3) To see whether cows which have aborted and have calved normally afterwards are really immune and have not merely recovered though still capable of being reinfected. (4) To see whether in a cow which has calved normally, though a reactor, the bacillus of contagious abortion is present in the milk or other excretions, and whether in the case of such a cow dying, the bacillus can be isolated from the uterine mucous membrane, etc. These experiments will have to be continued for another year, and although a considerable amount of information has been obtained, it is too early yet to make any announcement.

4. *Horse-sickness.*—The main objects of the past year's investigations have been two-fold, *i.e.*, firstly, to improve the method of inoculation for rendering horses immune against the disease, and, secondly, to ascertain the protective value of dipping.

The experience of previous years showed that the immunity conferred by inoculation was insufficient to protect horses against natural attacks of the disease and a considerable number had breakdowns. Attention was, therefore, paid to this point whilst at the same time efforts were made to reduce the loss from inoculation.

The desired objects have been satisfactorily achieved by the injection of two viruses, the second one being the virus that has been used successfully during the past few years for the inoculation of mules.

Up to the end of the financial year this amended method has been used on 314 horses, of which 11 died as a direct or indirect result of inoculation, or 3·5 per cent.

From these figures it will be seen that the mortality amongst horses is slightly higher than that experienced in mules, but even so it is better than our most sanguine hope of a 5 per cent. mortality. It now remains to be seen whether the low mortality can be maintained on a large number of horses. The immunity conferred by the improved method of inoculation has been tested by exposure experiments on 49 horses that were running at Onderstepoort during the worst time of last season. Two out of the 49 horses died of Horse-sickness, whilst three others contracted the disease and recovered, showing that a mortality of about 4 per cent. from relapses must be expected. The details of the investigations and experiments with the method of inoculation are now being compiled for publication in the Research Report.

5. *Dipping Experiments.*—Experiments to ascertain whether horses could be protected against Horse-sickness by periodical dipping were undertaken with the approach of the Horse-sickness season; 40 horses were sent to the Maritzburg Laboratory and 160 were kept at Onderstepoort, all of them being now dipped at different intervals in various dips and mixture.

6. *Pernicious Anaemia in Horses.*—Shortly before the outbreak of hostilities in Europe in 1914 a report was published by the Seyderhelms (father and son), of Strassburg, to the effect that Pernicious Anæmia was produced through the agency of Bots, and an announcement to this effect appeared in the South African Press. *A priori*, South African experience in the past seemed to negative this idea, but nevertheless it was deemed advisable to put the matter to the test at Onderstepoort. The result of our experiments was that Bots collected from the stomach of a horse that died of Pernicious Anæmia, when emulsified and injected into a susceptible horse, produced the disease in practically every instance. Further, Bots collected from the stomach of a horse not affected with Pernicious Anæmia did not produce the disease when injected into healthy horses. These were the results that we expected, showing that the Bots itself cannot produce Pernicious Anæmia, and although an emulsion of Bots collected from an infected horse produced the disease, it is a different matter whether Pernicious Anæmia could be transmitted through the medium of the adult flies, (*i.e.*, from larvae taken from horses with Pernicious Anæmia and by means of their eggs deposited on a susceptible horse).

7. *Wire Worms in Sheep.*—The life history of the wire worm has been investigated further and much valuable data collected, which will serve as a basis to assist in the fight against the wire worm pest. Details of this work appear in the 3rd and 4th Scientific Report of the Director of Veterinary Research. It may, however, be stated that the mixture of Cooper's Dip and Blue Stone recommended by the Division, particularly when administered to infected sheep on two successive days, is such a powerful remedy that it expels practically all the worms from their stomach. The remedy for wire worms is, therefore, a simple one, but their eradication cannot be expected from the medicines alone, and attention must be paid to the general management of sheep based on the life history of the worm itself.

8. *Trypanosomiasis.*—The investigations into Trypanosomiasis in Zululand, under the care of Mr. Mitchell, must be considered as a continuation of those undertaken last year by the Museum Expedition, the results of which corroborated the findings of the early investigations of Sir David Bruce, *i.e.*, that game are infected with Trypanosomes (in our experiments Impala, Bushbuck and Zebra).

The objects of the present investigations were not so much the repetition of the Museum Expedition work, but more to find out the extent of infection of Trypanosomes in Zululand, with particular reference to the spread of the disease and to the best means of prevention and eradication.

An interim report has been submitted by Mr. Mitchell in which the following conclusions were drawn:—

(1) Wandering game are responsible for primary outbreaks of the disease.
(2) Tsetse flies will not travel from the original fly belt unless cover is continuous or in company with game.
(3) In the absence of Tsetse it is unlikely that outbreaks of Nagana could originate from recovered or partly recovered cattle or from game localised to the cattle grazing area.

Certain recommendations have been made by Mr. Mitchell, with a view to localising game as far as possible and for their efficient protection in the Reserves, *i.e.*:

(1) The issue of permits to Europeans and natives living in Nagana areas authorising them to destroy "wandering game," in preference to indiscriminate shooting and "drives."
(2) Such permits should be valid during the summer months as well as during the "open" season.
(3) The destruction of game in infected areas should be encouraged by the issue of licences at reduced fees to non-residents.
(4) In the low veld areas where few if any cattle are to be found and in areas surrounding game reserves, the shooting of game under licence should be allowed.
(5) The effect of the above recommendations would necessitate increased supervision in game reserves, which could be effectively obtained by the appointment of an European ranger for each reserve and the surrounding district.
(6) The existing "open" area on both sides of roads should be maintained for some time.
(7) The bush adjoining roads passing through Tsetse fly areas should be repeatedly burned, and road repairs should be carried out at regular intervals.
(8) Finally, the assistance of owners is necessary to control Nagana, as insufficient herding, transport riding in summer in areas where the disease is endemic and lack of isolation measures are matters for owners to deal with and not the State.

9. *Gouw Ziekte in Sheep.*—An opportunity offered itself in the neighbourhood of Pretoria for further research in connection with this disease, and feeding experiments were undertaken to control the negative results obtained in the Lake Chrissie district in 1909. Investigations are now proceeding with the object of ascertaining the particular plant responsible but definite results are not yet to hand.

10. *Geel Dikkop in Sheep.*—This disease was brought to my notice for the first time this year, reports of outbreaks being sent in from the Hope Town and Colesberg districts. Mr. Walker was instructed to make local investigations and experiments were at once undertaken to ascertain whether the disease was infectious.

Inoculation experiments were carried out but so far have proved negative, thus corroborating the results of earlier investigators. Muzzling experiments have also been undertaken to see if the disease is contracted through the mouth. Feeding experiments were also taken with Dubbeltjes, a plant considered by many farmers to be the cause, but without result.

11. *Ornithodoros Megnini. The Spinose Ear Tick.*—In 1912 a tick new to South Africa was discovered by this Division, and this year numerous reports have been made from various parts of the Union as to its prevalence. Mr. Bedford, the Entomologist of

this Division, made personal enquiries in the Richmond area, and it appears that the tick is responsible for a considerable amount of trouble in sheep, goats and calves—a short memorandum has been published giving our recommendations for the treatment of affected animals.

12. *Stiff-sickness in Cattle and so-called "Rickets" in Donkeys and Sheep.*—Enquiries into these diseases and the collection of material have been undertaken whenever opportunity occurred, and a considerable amount of material has been obtained, which will be worked up when time and staff permit.

13. *Jagziekte in Horses.*—Investigations into this disease are being carried out in Pietermaritzburg, the primary object being to reproduce the disease artificially.

14. *Dunsickness in Horses.*—Investigations into this disease are being continued at Onderstepoort and Pietermaritzburg. In Pietermaritzburg attempts are being made to produce the disease with worms which are commonly found in the Caecum and Colon of horses affected with Dunsickness. In Onderstepoort feeding experiments are being made with a plant, known as Ragwort, which is believed to have some connection with the disease. The plant has killed two horses, but the symptoms of Ragwort poisoning differ from those found in Dunsickness and further experiments will be necessary.

General Remarks.—It must be pointed out that notwithstanding the number of subjects coming under the heading of "Research" which have been enquired into, only in three cases has it been possible to carry out investigations on systematic lines, and they are Horse-sickness, Lamziekte and Wire Worms in sheep. The other diseases have been dealt with more for our own information at present with the object of collecting as much evidence as possible in a rough and ready manner. The minute and detailed examination that these other diseases deserve could not and will not be carried out unless more time is saved on routine duties or unless the staff is increased in proportion.

A. THEILER,

Director of Veterinary Research.

APPENDIX IV.

DIVISION OF DAIRYING.

ANNUAL REPORT, 1915-16.

Staff and Office Matters.

The period under review has undoubtedly been a record one with regard to the amount of development work undertaken, and the services of the officers of this Division have never been in greater demand. Unfortunately, owing to a depleted staff, a good deal of useful work which should have been undertaken had to be abandoned. This was due to the fact that Dairy Inspector Gow and Dairy Instructor Dewey volunteered for active service oversea, which practically meant that the requirements of both the Cape and Natal Provinces had to be attended to from headquarters by either Senior Inspector Hardy or myself. Further, it was not found possible to secure suitable men to temporarily fill the vacant positions, and it is to be sincerely hoped that the two officers who have gone to the front will return safely and resume work in their respective areas where they have both done excellently in the past.

The office correspondence has been exceptionally heavy during the period under review, and when times again become normal, and the introduction of Dairy Legislation is an accomplished fact, it will be very necessary to increase the clerical as well as the technical staff of this Division, both of which have carried out their duties under most adverse conditions.

Butter and Cheese Production in the Union.

Total Output of	1915.		1914.	
	lbs.		lbs.	
Butter by Creameries	8,323,125		6,566,873	
,, sold on Markets	3,084,015		4,115,135	
,, ,, to Merchants	2,000,000			
Total..	———	13,407,140	———	10,682,008
Cheese—Cheeseries and Factories ..		1,098,784		605,686
Increases in 1915 over 1914 :				
Butter		2,725,132		—
Cheese		493,098		—

It will be noted that despite droughts and other drawbacks there has been a very satisfactory increase in both butter and cheese during 1915 as compared with 1914. The increase in the production of cheese is very encouraging, and no doubt would have been considerably greater had there been sufficient Instructors to undertake more development work.

With regard to the figures quoted for butter, these, so far as they allude to farmers' butter, are rather under than over-estimated; nevertheless, they show a considerable increase over this class of butter as compared with 1914. Taking into consideration the high prices paid for butter-fat by the Creameries, this is all the more astonishing, and I venture to state that the financial returns to the farmers, in the majority of cases, were very much lower than would have been the case had the raw material, in the shape of cream, which produced this butter, been purchased by the various Creameries in the Union.

Imports for 1914 and 1915.

	1914.		1915.	
	lbs.	Value.	lbs.	Value.
Butter	3,919,431	£194,768	2,026,158	£121,994
Cheese	5,223,283	157,405	3,966,269	155,466
Margarine and Butter Substitutes	920,888	22,094	1,198,023	31,283
Ghee	851,742	32,351	897,306	34,513
Butter imported but re-exported ..	195,611	9,694	205,881	12,762
Cheese ,, ,, ,, ..	—	—	109,133	5,381

These figures show a very satisfactory reduction in the importation of both butter and cheese, but, on the other hand, there is a considerable increase in regard to Margarine and Butter Substitutes, and I would here again point out the absolute need for uniform legislation to control this class of trade. The question which has to be definitely decided, and that in the very near future, is whether it is best for this country to encourage the manufacture of genuine articles, such as butter and cheese, or whether this important industry is to be replaced by the wholesale introduction and the manufacture of Margarine and Butter Substitutes.

In Canada it was recently decided that, in view of the importance of their dairy industry, Margarine could neither be imported nor manufactured, or allowed to be in the possession of any person.

In New Zealand, the regulations in force there were so stringent that it was not found possible to manufacture this article profitably.

In New South Wales this commodity is allowed to be manufactured and sold under certain conditions and proper control.

In Queensland it is also allowed to be manufactured, but must be coloured pink.

All these facts go to prove that other countries are fully alive to the necessity of protecting their dairy industries against unfair competition, and it is equally certain that this country will have to follow suit, as the existing regulations regarding Margarine and Butter Substitutes are not only not uniform but totally inadequate to afford any measure of protection in the future development of our dairy industry.

Creameries and Cheese Factories.

There are now established or in the course of erection in the Union, 50 Creameries, 6 Cream Depôts, 70 Cheese Factories and, approximately, 97 private Cheeseries.

This shows very satisfactory progress; but competition in some quarters is becoming very keen, and unless great care is exercised, and only sound products are turned out, I am afraid it will be a case of the survival of the fittest in the near future.

I am a great believer in progress and in developing the dairy industry to its fullest extent. But there are limits to the rate at which progress can be made, and I have frequently felt obliged to advise caution before some expensive scheme is entered upon. Often enough a Cream Depôt or small Cheese Factory will fulfil all the requirements in certain areas for several years to come.

The quality of both butter and cheese produced during the period under review leaves a great deal to be desired. Too great a percentage of Creamery butter, which had been stored for a considerable period, when opened up for examination had a decidedly stale and, in many cases, a distinctly "fishy" flavour. Allowing for the fact that we are not working in normal times, as well as for the difficulty experienced in obtaining well-trained men, there was still evidence that the handling and grading of the cream at several Creameries had been carelessly performed. More instruction is necessary to the cream suppliers. This is instanced by the fact that cream carried over the same distance, and under the same conditions, often arrives in a very uneven state and has to be graded in first, second or third grades, as the case may be. This shows either lack of knowledge or gross carelessness on the part of the supplier in the manner in which the cream has been handled previous to its despatch to the Creamery. In regard to the quality of cheese produced, one of the chief faults noticeable was its lack of uniformity. This fault is, of course, due to want of knowledge on the part of the cheese-maker, and in many instances to carelessness or laziness. Until such time as we are able to secure the services of more highly trained cheese-makers, all cheese should be graded before being sold to the merchant. Strong-flavoured and "acid cut" cheese was far too much in evidence this season, showing careless handling of the milk, either at the factory or at the farm.

I am of the opinion that more women should be employed in our factories as they usually make excellent cheese-makers, being more patient and painstaking, and giving more attention to that detail which is so essential to the production of uniformly good cheese.

The Dairy Industry Generally.

In viewing the dairy industry from a general standpoint, I venture to say that great advancement has been made, especially during the last few years.

The question of finding markets for our products in the future will have to be seriously considered, and when the time arrives to establish an export trade many radical changes must be made. The industry has now reached the stage when it requires legislation to take it properly in hand and direct it in the right channels.

If an export trade in butter is to be firmly established with the oversea markets, farmers will have to be prepared to accept a considerably lower price for their cream, and Creameries will have to grade more closely, and also be prepared to pasteurize all cream intended to be used for export. From experiments carried out by this Division last December, I am convinced that butter made for local consumption only, should be made from pasteurised cream. The experiments referred to prove beyond doubt that butter made from pasteurised cream keeps infinitely better, especially after long storage, than the control butter made from the same cream but not pasteurised.

The establishment of a meat export trade is now an accomplished fact, and will naturally enter, to a certain extent, as a competitor with the dairy industry. My own view on this point is that there is room for both, and that the greater the number of industries encouraged in any country, the more successful and prosperous will that country become. There is one point, however, which I would like to refer to in regard to this matter, and that is, that a fairly large percentage of farmers appear to be under the impression that they can simultaneously breed for beef and milk. I know that many arguments have been adduced both for and against, but my experience in regard to this is that if you put a purely milk strain bull into a herd of beef cows or, in the reverse ratio, a beef bull into a herd of dairy cows, both will defeat their own ends in the long run. If we take it as an accepted fact that, whether breeding either for beef or milk, in either case you have to feed, then surely in the case of beef production is it not more profitable to rear animals which are purely of a beef strain and which reach maturity in the quickest possible time? This equally, if not more so, applies to dairy animals, as it certainly does not pay to feed for milk production if such animals are those generally, but erroneously, known by some farmers as the "dual purpose" class.

ED. O. CHALLIS,

Superintendent of Dairying.

APPENDIX V.

DIVISION OF BOTANY.

ANNUAL REPORT, 1915-16.

CORRESPONDENCE.

The correspondence during the period under review was as follows:—Letters received, 3,785; letters despatched, 3,063.

STAFF.

The following changes, etc., took place in the staff:—

Dr. J. Medley Wood, the Director of the Natal Herbarium, died suddenly on the 26th of August, 1915, and Dr. van der Bijl was transferred from the Phytopathological Laboratory at Pretoria to the Natal Herbarium at Durban as Mycologist-in-Charge on the 1st October, 1915.

During the year the staff was increased by the addition of a Junior Lay Assistant with a commencing salary of £60, on the scale of £60-10-90.

The following members of the staff volunteered for active service and were released on the dates mentioned:—A. O. D. Mogg, Assistant Botanist, 24th December, 1915; H. A. Melle, Officer-in-Charge Botanical Station, 27th November, 1915; J. C. Howlett, Herbarium Assistant, 12th February, 1916.

In addition to the above changes certain temporary appointments in a minor capacity were rendered necessary.

BOTANICAL BRANCH.

Phanerogamic and Economic Herbarium.—In May, 1915, the Herbarium was moved from the corner of Wessels and Church Street to its present quarters, in a building erected alongside the Phytopathological Laboratory. The building consists of a single room 30 x 15 feet into which is crowded the whole Herbarium, tightly packed in 48 cupboards. Owing to the want of space, and the ever-increasing material which is being accumulated, a large quantity of the specimens have to be stored in outhouses adjoining. Lack of wall space in the Herbarium prevents the exhibition of framed specimens and drawings of noxious weeds, poisonous plants, etc.

During the year the whole Herbarium was arranged according to the Englerian system. The Herbarium at present contains 177 families, about 1,000 genera and some 50,000 species.

A valuable addition to the foreign Herbarium was received in the shape of some 470 specimens of European plants, all named and mounted, which constituted the working Herbarium of M. Max Happe. This young Frenchman, who was killed in Flanders, bequeathed his collection of plants to the Herbarium.

Some 1,000 plants from Uganda, 300 named sheets from Archdeacon Rogers, and 100 named sheets from Miss Pegler, Kentani, have also been added during the year.

Practically the whole of the time of the Officer-in-Charge was taken up with daily routine work, and more qualified assistance with this work is greatly needed. During the year 1,058 plants were received from correspondents for identification submitted from Portugese East Africa, Rhodesia, and all parts of the Union.

In spite of this, considerable progress has been made with the general Herbarium work of registering, pressing, mounting, labelling and classifying a large accumulation of undetermined material.

The grasses have been very thoroughly worked through and the Department now possesses probably the best collection of these plants in the country.

Cryptocarya vacciniifolia Stapf.—A tree, 80-90 feet high, found in Wolf River Forest, by J. D. Keet, D.F.O., Keiskama Hoek. Flowering specimens were submitted to us for determination and proved to be an undescribed species of *Cryptocarya*. Specimens were sent to Kew, and Dr. Stapf published a description of it under the name of *Cryptocarya vacciniifolia* Stapf in the Kew Bulletin No. VI.

Olinia radiata Stapf.—Tree growing in the Nusbane Forest, East Pondoland; specimens collected by Forester Siegh, submitted to us for identification, proved to be a undescribed species of *Olinia* for which Dr. Stapf proposes the name *Olinia radiata.* It is a large tree, 60-70 feet high, with a girth of 10-12 feet. Native name, "Umpanzi."

Pachystigma hirsutum Stent.—One of the commonest growing shrubby plants in the Pretoria District, known as "goor appel." It resembles *Dictapetalem cymosum* in general appearance and habit though it is far removed from it in actual relationship. It differs from *Pachystigma Zeyheri* in the shape and hairiness of the leaves, and in the size and pubesence of the calyx lobes and one or two other small characters.

Caralluma carnosa Stent n.sp.—A new species of Caralluma found on the Magaliesberg. The stems are thick and rather glaucous, with prominent teeth. The description is published in the Kew Bulletin.

Pancratium tortuosum.—This beautiful white lily was found growing amid the grass on the farm Klippan, in the Waterberg, by Mrs. M. H. Walker, and sent to us. The flowers are large and white, borne on rather short peduncles; the leaves, which are hysteranthus, are curled like a corkscrew. The *Pancratiums* are mostly tropical plants and are much cultivated in gardens. This is the first record we have of one occurring in the Transvaal. Another species, with straight leaves, occurs in the Cape Province.

NOXIOUS WEEDS.

The Division is responsible for identifying and reporting on all suspicious weeds submitted by farmers and others throughout the Union. We advise the Provincial and Divisional Councils of the Union on all matters pertaining to noxious weeds, their proclamation and eradication.

As regards the proclaiming of noxious weeds our policy is rather one of limiting the number as much as possible and enforcing the law strictly, than including every weed over which a few farmers get a scare and through inability to cope with the growing list letting the law become a dead letter. Before proclaiming a new weed careful consideration should to be given as to: (1) The nature of the weed—its method of reproduction; (2) the injurious properties—whether harmful to stock, or to grazing veld, to cultivated crops, etc.; (3) the means of eradication and whether it will be possible to cope with the weed and enforce its eradication should it be proclaimed. We are also believers in the old proverb, "Prevention is better than cure," and advocate strongly the proclaiming of a weed known to be a bad pest in other countries, the moment one plant of it is recorded from the Union. Thus may its spread be checked.

Centaurea solstitialis and *Centaurea calcitrapa* are thistle-like weeds that have proved very troublesome pests in Australia. We have had reports of stray plants appearing in the Union, and so on our recommendation they appear among the proclaimed weeds; and it is hoped that by these means they will be prevented getting a sure foothold in the country.

Another weed that has recently made its appearance amongst us is *Acanthospernum hispidum*, the "star burr," so called because the small burrs are covered with hooked spines and are likely to be quite as harmful to wool as the ordinary "burr weed" or "cockle burr."

A second species, *Acanthospernum brasilum*, is spreading in the Orange Free State. It is a prostrate plant with spreading rooting stems. Both these plants hail from South America—which country is the origin of most of our noxious weeds—and they are taking very kindly to their new home. *A hispidum* is already making itself felt as a pest in the Marico district of the Transvaal and in Natal.

Tagetes minuta, the Mexican Marigold, another of our South American enemies, has been causing a good deal of agitation. Many have been the requests to the Provincial Council to legislate against it. We have always rather deprecated such a proceeding. The weed is mostly found in the Municipal areas and along transport roads; it is an annual that can be eradicated by systematic ploughing or hoeing up before it flowers. By reason of its distinctive fern-like foliage it is easily recognised. In the young state the seeds are seldom carried far from the parent plant, and a farmer in refusing to clean his land seldom harms his neighbours to any great extent. There is no reason, however, why the towns should not forcibly be cleaned of this objectionable weed, and many of the Municipalities have proclaimed it within their areas.

Alternanthera Achyrantha, Khaki weed.—This troublesome little prostrate plant with its whitish burrs has taken a firm hold of this country, and it has been found impossible to legislate against it. On some of the farms where it carpets the ground, the farmers don't object to it; they say ostriches and small stock graze on it and keep it within bounds, and were they forced to eradicate, it would mean a very big expenditure. Also we cannot suggest any practical method of exterminating it—in some places it grows thickly amongst the rocks and stones of the kopjes. It is a perennial and deep-rooted. Until we can give the farmer a really effective method for its eradication it is useless to place it amongst the proclaimed weeds.

Cuscuta arvensis.—This is one of the most troublesome dodders that attack lucerne, and not only lucerne; it is equally at home on a number of native plants. We have had specimens of this dodder from Grootfontein, Middelburg, on species of *Conyza* (Composite), *Cyperus*, *Asclepias*, *Senecio*, *Amarantus*, *Salvia*, *Panicum*, *Lycium* (Solanaceae) *Convolvulus* and lucerne.

The fact that this parasite is apparently quite impartial in the matter of hosts constitutes its danger. A field of lucerne in which perfectly clean seed was sown may become infected from the surrounding veld, and it therefore behoves the farmer to look well for this pest outside his lucerne land as well as in it.

Xanthium italicum.—This is another of the cockle burrs and has appeared in the coastal district of the Cape Province. We have four species of *Xanthium* reported from the Union—*Xanthium strumarium*, *Xanthium occidentale*, *Xanthium italicum* and *Xanthium spinosum*. The three first are more or less alike mostly in the size and pubescence of the burr and the density of the spines, but would all three be classed as "cockle burrs," and be equally harmful to wool. Because of these fairly new arrivals and because it is quite possible other species may still be introduced from the same source, we have advised all the Provincial Councils to alter the reading of the Noxious Weed Law, so as to include all and any *Xanthium* species that are or may be introduced. We have extended the same advice in regard to *Cuscuta* for the same reasons.

The following are the noxious weeds at present proclaimed in the four Provinces of the Union:—

In the Cape Province:

Xanthium spinosum = Burr weed.
Xanthium strumarium = Cockle burr.
Cuscuta spp. = Dodder.
Argemone mexicana = Mexican Poppy.
Opuntia pusilla = Jointed cactus.
Opuntia tuna et. var. = Prickly pear.
Inula graveolens = Khaki bosch.
Elytropappus Rhinocerotis = Rheinoster bosch.
Cnicus lanceolatus = Spear thistle.
Cestrum vespertinum
Alternanthera echinatus = Amarantus weed.
Centaurea melitensis = Malta thistle.
Salsola Kali. = Salt wort.
Pupalia atropurpurea
Centaurea solstitialis = S. Barnaley's or Yellow Thistle.
Centaurea calcitrapa = Star thistle.
Mesembryanthemum pinceum = Grote lidjes.

In the Orange Free State:

Xanthium spinosum.
Opuntia pusilla.
Xanthium strumarium.
Cuscuta trifolii.

In Natal:

Xanthium spinosum.
Xanthium strumarium.
Cnicus Diacantha.
Cuscuta spp.
Opuntia pusilla.

In the Transvaal:

Xanthium spinosum.
Xanthium strumarium.
Cuscuta spp.
Opuntia pusilla.
Cnicus lanceolatus.
Centaurea solstitialis.
Centaurea calcitrapa.
Centaurea melitensis.

The Municipalities of the Transvaal are gradually coming into line and co-operating with the Provincial Council by proclaiming within their areas all the weeds proclaimed by the Council, adding in many cases others that are specially troublesome in their respective districts. For instance, Johannesburg has included *Tagetes minuta* (Mexican Marigold) and *Cannabis sativa* (dagga). Belfast has included Mexican Marigold, dagga, Khaki weed, and Slangkop (*Urginea Burkei*). Heidelberg has proclaimed the same, while Zeerust has included the star burr, *Acanthospermum hispidum.*

POISONOUS PLANTS.

Nothing fresh has been discovered with regard to the poisonous plants of the Union during the year, but we dealt with a great deal of correspondence on the subject, and a very large number of suspected plants were sent in for identification and report. Feeding tests carried out in these plants through the courtesy of the Director of Veterinary Research, only yielded negative results.

In the Transvaal Gift-blaar (*Dichapetalum cymosum*) continues to cause severe loss amongst stock, and so far no satisfactory method of eradication has been discovered. Miss Stent wrote a very complete article on the plant in March last, which has been reprinted in pamphlet form and distributed amongst farmers in the affected areas. The pamphlet contains a detailed description of the plant and also of those that might be mistaken for it.

A large proportion of my own time has been devoted to botanical investigations of Gallamziekte and Gauwziekte areas at Vryburg and in the neighbourhood of Pretoria, respectively, in conjunction with the Director of Veterinary Research.

The whole subject of our poisonous plants is one that sadly needs thorough investigation and special officers deputed for research in this branch alone.

The Director of Veterinary Research is at present inclined to attribute the following unsolved stock diseases, such as Lamziekte and Stiff-sickness in cattle, Dunziekte and Jagziekte in horses, Geeldikkop and Gauwziekte in sheep, to plant poisoning, and the sooner we are able to give him more assistance with these problems the better will it be for the country in general.

The following are at present known poisonous plants in South Africa:—

Dichapetalum cymosum = Giftblaar.
Equisetum ramosissimum = Horse tail.
Lolium temulentum = Dronk gras (Cape Prov.).
Melica decumbens = ,, ,, Tares.
Urginea Burkei = Transvaal Slangkop.
Urginea macrocentra = Natal Slangkop.
Ornithoglossum glaucum = Cape Slangkop.
Ornithogalum thyrsoides = Chinkerinchees.
Homeria pallida = Yellow tulp (Trans.).
Homeria collina = ,, ,, (Cape).
Moraea spp. = Purple tulp.
Crotalaria Burkei = Stijfziekte bos.
Indigofera cryptantha = Wild Indigo.
Cassia obovata
Lessertia annularis = T'nenta.
Acokanthera venenata = Gift boom.
Acokanthera spectabilis = ,, ,, (Cape).
Nerium Oleander = Ceylon rose.
Strophanthus speciosus
Adenium multiflorum = Fish poison.
Solanum spp. = Bitter apple.
Nicotiana glauca = Wild tobacco.
Cestrum nocturnum
Datura stramonium = Stink-blaar.
Dimorphotheca Zeyheri ? = Bietouw.
Senecio latifolius
Geigeria passerinoides = Vomeer bosjes.
Cotyledon orbiculata
Cotyledon ventricosa = T'nenta.
Cotyledon Eckloniana = ,,
Euphorbia peplus.
Euphorbia genistoides = Pis-goed.
Euphorbia spp.
Cynanchum capense = Klimop.
Asclepias fruticosa = Melk bosch.
Raphionacme velutina

There are many other plants suspected of possessing toxic properties. In some cases it is possible that the suspicions are correct, but further experiments are necessary before they can be confirmed with certainty.

BOTANICAL STATION, GROENKLOOF.

The chief work carried out at the Botanical Station was the introduction and testing of various indigenous and foreign crops. Nine new varieties of Burbank's Spineless Cactus have been established. These include those known as: Competent, Model, Arbiter, Signal, Buster, Pyramid, Solano, Sarita, Rosa and Fresno. Considerably over 10,000 cuttings of Spineless Cactus were distributed to farmers and others during the year, and revenue amounting to £167 6s. 10d. was obtained from the sale of the cuttings alone.

Kikuyu grass continues to do well, and is one of the most valuable grasses grown at the Station both from a drought-resisting and food-analysis point of view. The analysis of this grass (air-dry), as supplied to us by the Acting Chief Chemist, is as follows:—

Moisture	8·29	Fat (Ether extract)	1·79
Protein	12·36	Crude Fibre	33·08
Carbohydrates	35·06	Ash	9·42
Containing True Protein	8·31		
Nitrogen	1·977		
Albumenoid Nitr.	1·330		

The Division has also made use of 70-80 acres of ground at what was originally the Dryland Station at Pretoria. The ploughed ground out of 160 acres has been used for establishing permanent pastures of Kikuyu grass, New Zealand Tall Fescue, *Phalaris bulbosa, Atriplex semibaccata*, Sheeps Burnet, Paspalum, and eight different varieties of lucerne. A large piece of ground is also being utilized for establishing pure cultures of grasses and other plants from Gallamziekte areas, for definite feeding experiments, etc., in connection with this disease. A large piece of unbroken veld in the same area is also being used for observations with regard to veld burning. Some experiments have been laid down in connection with the possibilities of growing *Asclepias fruticosa* and *Sida rhombifolia* as fibre crops.

The exploitation and cultivation of plants for medicinal purposes has received some attention. Excellent reports have been received on *Datura stramonium* leaves sent to London for analysis. The possibilities of growing this crop commercially are being tested at the Botanical Station.

WITCH-WEED OR ROOIBLOEM.

A considerable amount of work has been carried out in the "rooibloem" pest, both by means of pot cultures at the Laboratory and by field experiments at Koedoespoort.

In both instances it has been definitely established that Teff and Soudan grass are highly susceptible to this pest, and experiments are now being carried out to see whether these grasses can be put to any practical use as catch crops for cleaning lands infested with "rooibloem" seed.

PHYTO-PATHOLOGY.

During the year a vast amount of both routine and research work has been done. For the latter Dr. Doidge has been mainly responsible. Unfortunately we are still without the necessary greenhouse accommodation which is essential for the carrying out of infection experiments and the investigation of physiological problems.

In the Mycological Herbarium, Miss Bottomley registered, mounted, labelled, indexed, and filed away 781 specimens. She also fitted up 8 show cases with specimens of South African fungi representative of the various groups, including those fungi which cause well-known diseases of fruits, vegetables and forest trees.

She has drawn up a classified list of the South African Fungi represented in the Herbarium, and which includes over 4,300 species. In addition to this, she has been busy with investigations dealing with an oak disease prevalent in the Cape, and several obscure diseases of Spineless Cacti.

Dr. Doidge has devoted special attention to Potato and Tomato diseases, and, in particular, the internal brown fleck and early blight of the potato, and leaf spot and blossom end rot of the tomato.

Investigations into the internal brown fleck of the potato are being carried out with the assistance of the Chief Chemist. Up to the present all samples of soils examined, and in which brown fleck potatoes were grown, have proved to be deficient in lime, available nitrogen and phosphates.

Experiments carried out so far with seed with internal brown fleck showed that when planted in suitable soil perfectly sound tubers are produced.

In the case of Early Blight (*Macrosporium solani*) extensive field experiments are now being carried out at the Botanical Station, Groenkloof, to test the value of spraying with Bordeaux mixture in checking the disease. Similar experiments are also in progress in cases of tomato leaf spot caused by *Septoria lycopersici* Speg.

Blossom-end Rot.—This is the most serious trouble in tomatoes in this country. The disease is well known in Europe and the United States, but investigations conducted elsewhere have led to most contradictory results. A study is being made of this disease, and it is intended next season to carry out a number of culture experiments in order to discover which varieties are more or less immune.

Black Rot of Cabbages.—Dr. Doidge has proved the identity of the organism causing this prevalent disease with *Bacterium campestre* and has published a short paper on the subject.

South African Perisporiales.—She has also completed a paper on these mildews and it is now being published by the Royal Society of South Africa.

Bacterial Spot of Lemon and other Citrus Fruits.—This disease has occupied most of Dr. Doidge's time since July. She has shown that the black spot of citrus fruits occurring in certain orchards in the Western district of the Cape is due to a bacterial organism hitherto undescribed. Its characters have been studied, and also its effect on its host plant; its geographical distribution ascertained and arrangements made to carry out a spraying experiment on a fairly large scale in one of the affected orchards in the Groot Drakenstein Valley.

In addition to the above-mentioned troubles Dr. Doidge has carried out a considerable amount of preliminary work with:—

1. A bacterial blight of pear blossom.
2. A citrus fruit spot caused by *Phoma* sp.
3. Citrus canker.
4. A bacterial disease of the lucerne caterpillar.
5. A bacterial disease of bagworms.
6. Anthracnose of citrus fruits.
7. Bacterial wilt of lucerne.
8. A black spot of mangoes.

Dr. Doidge has published the following during the period under review:—

(1) In the "Annals of Applied Biology":—

   1. A Bacterial Disease of the Mango. Vol. II., No. 1, May, 1915.
   2. The South African Mulberry Blight. Vol. II., No. 2, July, 1915.

(2) In "The Transactions of the Royal Society of South Africa":—

   1. Notes on the South African Erysiphaceae. Vol. IV., Part III., 1915.

(3) In the "Agricultural Journal of South Africa":—

   1. Black Heart of Potatoes, April, 1915.
   2. Two Diseases of the Mulberry Tree, May, 1915.
   3. Internal Brown Fleck of Potatoes, June, 1915.
   4. Bacterial Disease of Plants, July, 1915.
   5. A Bacterial Spot of Citrus Fruits, November, 1915.
   6. Notes on some Lucerne diseases, December, 1915.
   7. Notes on some Lucerne diseases, January, 1916.

(4) In "The South African Fruit Grower":—

   1. A Spot Disease of Citrus Fruits, September, 1915.
   2. Anthracnose of Citrus Fruits, December, 1915.
   3. A Bacterial Blight of Pear Blossom, January, 1916.

(5) In "The Farmer's Weekly":—

   1. A Bacterial Spot of Citrus Fruits, October, 1915.

(6) The following papers have been complete and are now in the Press:—

   1. A Bacterial Spot of Citrus. (A detailed technical paper which will appear in the "Annals of Applied Biology".)
   2. On the occurrence of *Bacterium campestre* in South Africa, in the "Journal of the South African Association for the Advancement of Science."
   3. The South African Perisporiales.
      1. Perisporiales. In "The Transactions of the Society of South Africa."

Dr. van der Bijl has been engaged on investigations dealing with:—

1. A Die-back of fruit trees due to *Cytospora leucostoma.*
2. An apple cracking disease caused by *Coniothecium chomatosporum.*
3. Dry Rot of Maize due to *Diplodia Zeae* (Schw.) Lev.
4. Relation between *Polysaccum crassipes* and *Eucalyptus* sp.

In addition he has devoted some attention to the following:—

1. Pinking of maize kernels.
2. Maize leaf variegation.
3. Red spot in cheese.
4. Root rot of lucerne.

He has also taken up the study of the South African Polyporaceae, which cause considerable damage of forest trees and timber.

NATAL HERBARIUM.

Owing to Dr. Medley Wood's death Dr. van der Bijl was transferred to the Natal Herbarium on the 29th September, 1915, and he has been entrusted with the fitting up of the late Dr. Medley Wood's house as a laboratory for the investigation of diseases of tropical and sub-tropical crops.

Owing to the extreme difficulty in obtaining laboratory equipment and supplies since the war began, and also the great scarcity of funds, it has not been possible to get the laboratory equipped as quickly as might have been done, and I am afraid some considerable delay may yet occur before it is adequately fitted out.

There are at present in the Herbarium 49,093 specimens, and of these 15,833 are South African.

Volume VII. of the "Natal Plants" has been completed, and now awaits publication.

Dr. van der Bijl has published the following articles during the year:—

(1) In "The Agricultural Journal of South Africa":—
1. Symptoms of Plant Diseases. Vol. I., No. 4.
2. Dry Rot of Timber. Vol. II., No. 8.
3. Die-back of Fruit Trees. Vol. II., No. 11.

He also submitted the following for publication:—
1. Die-back of Apple trees caused by *Cytospora leucostoma*. "Journal of S.A.A.A.S."
2. Note on *Coniothecium chomatosporum*. "Journal of S.A.A.A.S."
3. Study of the Dry-Rot disease of Maize caused by *Diplodia Zeae* (Technical Bulletin.)
4. Note on *Polysaccum crassipes* DC.

GENERAL.

Some progress has been made during the period under review in the way of getting the grounds around the laboratory at Pretoria into shape, and the collection of indigenous plants which has been established here has attracted a good deal of attention, and has been the means of stimulating considerable interest in our indigenous flora.

As soon as we are able to do so, I hope to get the more important economic plants of the country properly arranged and grouped together under fibre plants, medicinal plants, poisonous plants, and so on.

I. B. POLE EVANS,

Chief, Division of Botany

APPENDIX VI.

TOBACCO AND COTTON DIVISION.

ANNUAL REPORT, 1915-16.

Correspondence.—During the period under review 4,331 letters and telegrams were received and despatched at Head Office. Some of these letters were in connection with the administration of the Division, but the bulk of them were from farmers who were making enquiries about the various phases of tobacco and cotton culture.

General Clerical Work.—In addition to the correspondence, this office and the district offices devoted considerable time to checking accounts, keeping records, stocktaking, purchasing equipment and writing reports and articles relating to tobacco and cotton culture. Unfortunately the office work of this Division has suffered considerably on account of the whole of the clerical staff being away, for a time, on temporary duty with Defence. One clerk, however, has returned, but the head clerk is still away.

Publications.—In addition to a number of articles appearing in the various agricultural journals and daily papers, the following bulletins were issued:—

"Tobacco variety tests."
"Marketing tobacco by means of Co-operative Societies."
"Preparation and care of tobacco seed beds in the low country."
"Cotton seed and its uses."

Staff.—The staff changes during the year have been as follows:—T. E. Elgin, Warehouse Expert, terminated his contract last September; G. van Belkum, Assistant in fermenting experiments was transferred to Income Tax Department last September; J. de Ridder, Clerk, formally seconded to Defence, returned to this Division last August; Foremen Jackson and Germond are at the front, and temporary foremen are filling their places. Foremen Lewis and de Pradines have resigned, and Schuurman has been appointed in place of Lewis. The present staff is as follows:—

Chief, W. H. Scherffius; Assistant Chief, H. W. Taylor; First Grade Clerk, T. A. J. Place (at present with Defence); Clerk, J. de Ridder. Officers in Charge of Experiment Stations: H. W. Taylor, Rustenburg; E. H. T. Powell, Tzaneen; R. T. Falgate, Piet Retief; L. M. Stella, Elsenburg. Itinerant Officers: W. B. Wilson, Durban, Natal; J. du P. Oosthuizen, Vredefort, O.F.S.; P. Koch, East London, C.P.

Store Room.—A store and seed room is maintained down town, with a native in charge, he assists in cleaning, grading and distributing tobacco seed grown by farmers and ourselves, and also in preparing and storing exhibits and equipment belonging to this Division.

Agricultural Shows.—An exhibit from this Division was placed on all of the principal shows held in the Union last season. There was always one of the officials in attendance to explain the exhibit and the work of the Division to the public.

Tobacco Warehouses.—The tobacco warehouses at Rustenburg and Paarl have had a very successful year. On account of unfavourable weather conditions and the unsettled state of the country last year, due to Rebellion and War, the crop was considerably curtailed, and this gave the warehouses an opportunity to dispose of their old stocks. As a result the Rustenburg warehouse has less than a quarter million pounds of leaf on hand, and contracts have already been made to dispose of most of what remains. The Turkish Tobacco Warehouse at Paarl has sold every pound of their last year's crop. This season the warehouses will not have sufficient tobacco to meet the demands.

Cotton Gins.—The two ginning plants in Rustenburg last season, 1915-16, ginned and baled more than 400,000 lbs. of seed cotton. The entire crop was sold at prices ranging from 7d. to 7½d. per lb. f.o.r. Rustenburg. There were more than 500,000 lbs. of seed cotton produced in the Union. Heretofore no mention has been made of the value of the seed for the production of oil, cake and fertiliser. When the cotton industry is a little more advanced a mill for the conversion of the seed into these by-products will assist considerably in advancing the cotton industry; besides, it will be a considerable saving to the country. Last year there were approximately 400,000 gallons of cotton seed oil shipped into this country at a cost of £48,000. Cotton seed cake is recognised as one of the best concentrates obtainable for feeding dairy and beef cattle. There is little doubt but that it will be made use of as soon as it is placed on the market. A firm in Pretoria are now placing cotton seed meal on the market, and they are having some success.

The present indications are that there will be a much larger crop of cotton planted next season.

Seed Distribution.—A large number of packages of tobacco and cotton seed were distributed to farmers. The increasing demand for seed grown under Government supervision indicates that farmers place confidence in the quality of seed which is sent out by Government. We supply tobacco seed at 1s. per oz., and cotton seed at 1d. per lb.

Itinerary.—The Chief of the Division and his Field Officers have done a considerable amount of travelling as occasion demanded it. The itinerant men have been constantly on the move.

Lectures.—Officers of this Division have given series of lectures at all of the Agricultural Schools. Their lectures pertained to tobacco and cotton culture.

District Officers.—The four officers in charge of experiment stations and the three itinerant officers have paid special attention to the following problems in connection with tobacco and cotton culture:—

1. Fertiliser experiments.
2. Seed selection.
3. Variety tests.
4. Methods of curing tobacco.
5. Production of crops on different kinds of soil.
6. Different methods of cultivation.
7. Seed distribution.
8. Lecturing to farmers' meetings and visiting farms to give advice.
9. Training students in farm operations with special reference to tobacco and cotton culture.
10. Keeping daily records of temperature and rainfall.

RUSTENBURG EXPERIMENT STATION.

Correspondence.—During the year the Officer-in-Charge received and despatched 680 letters and telegrams, and, in addition, the regular monthly returns and monthly reports.

Visitors.—136 visitors called at the station during the year.

Cotton.—The cotton on the fertiliser plots in 1914-15 gave some very interesting results. In every instance fertiliser with lime gave larger yields than fertiliser without lime, and in some instances the yield was more than doubled. The best yields were obtained where both lime and phosphates had been previously applied. The best yield, 1,104 lbs. of seed cotton per acre was obtained on the complete fertiliser plot.

The farmers in the district are very enthusiastic about the cotton prospects. The crop at the station this season, 1915-16, is fair. I estimate that the crop for the Union will be about equal to that of last year.

Tobacco.—This season's crop is one of the best yet produced at the station, and when it is completed we should have some interesting results as to the best type of drying shed to use. The approximate weight of the crop is from 9,000 to 10,000 lbs., with an estimated value of £300. The crop for the district will be about three and a half million pounds, and it is one of the best ever produced.

TZANEEN EXPERIMENT STATION.

Correspondence.—During the year the Officer-in-Charge received and despatched 850 letters and telegrams, and, in addition prepared the regular monthly returns and reports.

Visitors.—There were 199 visitors at the station during the year.

Cotton.—The cotton crop for the season was very good. The attached table shows the results of acre plot variety tests:—

Name of Variety.	Weight of lint.	Value of lint at 7d. per lb.	Value of seed at £3 per ton.	Total value of crop
Cook's Long Staple ..	325 lbs.	£9 9 7	£0 19 6	£10 9 1
King	418 ,,	12 3 10	1 4 3	13 8 1
Triumph	342 ,,	9 19 6	0 19 9	10 19 3
Bancroft	262 ,,	7 12 10	0 15 9	8 8 7
Griffin's	319 ,,	9 6 0	0 18 9	10 4 10
Cleveland	428 ,,	12 9 8	1 5 6	13 15 2

A number of farmers in the district have again taken up cotton culture, as they now realize that it is a crop which they can profitably grow.

Tobacco.—Although the tobacco crop was planted late, it came on well, and will give a good yield.

Horticulture.—The fruit crop was light; however, a fair quantity was shipped to the market. The gardens are all kept in good condition.

General.—Considering the variety of experiments which are being conducted at this station, but which do not appear in detail in the reports, such as maize variety tests, castor bean variety tests, grass plots, fertiliser experiments on ground nuts, and green manuring crops. One would conclude that the station is performing a useful mission in the district.

PIET RETIEF EXPERIMENT STATION.

Correspondence.—During the year the Officer-in-Charge received and despatched 684 letters and telegrams, and, in addition, prepared the usual monthly returns and reports.

Visitors.—There were 328 visitors at the station during the year.

Tobacco.—The tobacco crop is by far the best that has been produced on the station, the approximate weight being 9,000 lbs., with an estimated value of £225.

General.—The other field crops such as paspalum, teff, maize and green manuring crops all did splendidly.

ELSENBURG TOBACCO STATION.

Correspondence.—During the year the Officer-in-Charge received and despatched 787 letters and telegrams, and, in addition, prepared the usual monthly returns and reports.

Visitors.—There were 120 visitors at the station during the year.

Tobacco.—The tobacco crop for the season is quite up to the standard of previous years, the approximate weight being 2,300 lbs., with an estimated value of £300.

Seed Breeding.—This is a line of work which we propose to devote more time to in future at this station, as the future of the Turkish tobacco industry is largely dependent on our being able to produce a strain of seed which can be substituted for the imported article.

ITINERANT OFFICERS.

Correspondence.—The Itinerant Officers in Natal, Orange Free State, and Eastern Districts, C.P., received and despatched 907; 381 and 265 letters and telegrams respectively, and, in addition, prepared the usual monthly returns and reports.

BALANCE SHEETS.

The attached balance sheets of revenue received and expenditure by the District Officers give an interesting comparison of the costs of maintaining experiment stations as compared to maintaining Itinerant Officers. I should explain that the Rustenburg and Piet Retief Stations took over a considerable quantity of stock and implements from other stations that were being closed down, and which they now have as an asset; otherwise the debit side of their sheets would have been much smaller.

In these balance sheets no account has been taken of officers' salaries. On the other hand, all labour and the purchase of equipment are charged against revenue, whereas a considerable portion of it is devoted to non-revenue producing work, such as maintenance and experiments.

W. H. SCHERFFIUS,

Chief of Division of Tobacco and Cotton.

ANNEXURE I. TO APPENDIX VI.—LAND UNDER CULTIVATION AND YIELDS.

		Rustenburg.	Elsenburg.	Piet Retief.	Tzaneen.
Land under crops	acres	100	15	101	119½
,, fallow	,,	nil	10	2	—
Crops on land under tobacco	,,	11	3½	9	3
,, ,, ,, ,, cotton	,,	12	nil	2	11
,, ,, ,, ,, mealies	,,	20	1	44	35
,, ,, ,, ,, forage	,,	6	13¾	28	18½
Crops on land under velvet beans and pea nuts, cow peas, soya beans, sunflowers etc.	,,	21	—	—	52¼
Crops on land under teff and manna	,,	30	—	16	—
Yields.—Tobacco	estimated lbs.	10,000	2,200	*	1,431
Cotton	lint	2,183	—	—	2,739
Mealies	bags	60	†	140½	210
Forage	lbs.	27,000	—	—	40,000
	bundles	—	6,000	—	—
	tons	—	—	20	—
Teff and Manna	loads	4	—	—	—
	tons	—	—	31	—
Cow peas	lbs.	—	—	230	‡
Pea nuts	bags	—	—	8	242
Soya beans	lbs.	—	—	3,600	‡
Velvet beans	bags	—	—	—	10
Castor oil	lbs.	—	—	—	200
Sunflower	bags	—	—	—	6

* Not yet stripped. † Other crops consumed as green forage. ‡ Ploughed under.

ANNEXURE 2 TO APPENDIX VI.—TOBACCO AND COTTON EXPERIMENT STATIONS. STATEMENT OF RECEIPTS AND EXPENDITURE FOR THE YEAR ENDED 31ST MARCH, 1916.

Receipts and Expenditure.	Rustenburg.	Piet Retief.	Tzaneen.	Elsenburg.
(*a*) *Receipts.*	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Sales of Tobacco	157 12 4	45 3 4	122 12 5	238 7 9
,, Plants and Seed	7 15 9	3 8 0	10 6 6	11 19 0
,, Cotton Lint	75 19 10	—	58 4 3	—
,, Cotton Seed	22 6 5	—	2 10 10	—
,, Pea Nuts	0 5 0	—	41 2 6	—
,, Fruit	—	—	65 18 2	—
,, Farm Produce	—	—	4 10 0	—
,, Other Seed	—	4 0 0	9 0 0	—
,, Horses and Mules	293 10 9	—	3 0 0	—
,, Oxen	—	—	34 0 0	—
,, Machinery	—	—	221 16 3	—
,, Sheet Tin	—	—	85 12 5	—
,, Harness	—	—	—	1 10 0
Total Actual Receipts ..	557 10 1	52 11 4	658 13 4	251 16 9
Transfers.				
Farm Produce	2 5 0	5 0 0	77 15 0	—
Tobacco Seed	—	2 8 0	3 0 0	—
Cotton Seed	9 2 8	—	0 5 0	—
Horses	—	—	—	50 0 0
Mules	30 0 0	—	—	—
Total (*a*) *Receipts*	598 17 9	59 19 4	739 13 4	301 16 9
(*b*) *Expenditure.*				
Foremen Salaries and Wages ..	606 11 1	376 19 0	687 4 6	268 9 3
Sundry Stores	22 12 11	17 3 4	11 19 11	7 8 2
Sundry Equipment	29 5 10	57 6 0	27 15 0	19 11 10
Implements, Repairs, &c. ..	12 7 9	20 3 0	25 17 9	4 19 6
Fruit Boxes	—	—	25 0 0	—
Fuel	29 15 6	10 18 3	—	—
Seed	17 8 9	16 17 6	21 17 9	7 9 8
Manures	6 17 6	57 10 0	22 12 2	11 9 5
Feeding Stuffs	30 18 0	16 11 0	8 10 10	44 0 1
Fencing	—	—	—	46 18 5
Trees	—	—	—	8 5 7
Railage	68 4 1	38 8 11	82 10 6	16 10 1
Incidentals	16 18 10	12 7 6	14 13 0	5 19 9
Entertainment of Visitors ..	1 7 9	8 4 6	10 1 6	3 6 6
Equipment for Hostel	12 12 9	—	—	—
Total Actual Expenditure	855 0 9	632 9 0	938 2 11	444 8 3
Transfers.				
Horses	50 0 0	—	—	—
Cattle	155 0 0	—	—	—
Implements	5 0 0	61 13 0	—	—
Sundry Equipment	3 1 0	1 15 0	5 0 0	—
Seed	5 15 0	—	—	—
Manures	15 0 0	75 0 0	37 10 0	—
Total (*b*) *Expenditure* ..	1,088 16 9	770 17 0	980 12 11	444 8 3
Debit	489 19 0	710 17 8	240 19 7	142 11 6

Annexure 3 to Appendix VI.—Tobacco and Cotton Itinerant Officers. Statement of Receipts and Expenditure Exclusive of Salaries for the Year ended 31st March, 1916.

Receipts and Expenditure.	Natal.	O. F. S.	Eastern Dists. Cape Province.
Receipts.	Ginning Cotton £ s. d. 9 17 2	£ s. d. —	Sale of Horse £ s. d. 11 3 1
Expenditure.			
Fertilizers, etc.	60 2 8	28 11 8	19 14 2
Subsistence and Travelling	167 8 3	261 16 6	173 0 0
Total Expenditure	197 10 11	290 8 2	192 14 8
Debit	187 13 9	290 8 2	181 11 7

APPENDIX VII.

DIVISION OF HORTICULTURE.

ANNUAL REPORT, 1915-16.

Staff.—Slight changes have taken place in the personnel of the staff immediately under the control of this Division. The foremen at Warm Baths and Tzaneen, respectively, have left the Department, and found in each case more remunerative employment in other spheres. The experience they gained whilst in the employ of this Division is therefore available for private enterprise. This I take it is for the benefit of the country at large, and forms a useful function of this experimental station. The vacancies created have been filled in one instance only, that of Warm Baths.

Amongst the staffs of the various Schools of Agriculture some readjustment has taken place, and the loss of Mr. Parsons, of Elsenburg College, who fell in battle in France, will call for the introduction of fresh blood into the work of the Division. Unfortunately the youth of South Africa does not take as readily to fruit growing as to some other classes of farming; this is to be regretted as fruit is a growing, profitable and important industry calling for intelligence, ability and energy such as one would expect from students who pass through the various Agricultural Schools.

Work of the Division.—The Horticulturist at Warm Baths was absent on active service in the South West Protectorate for 4 months during the earlier part of the year. He states that the *climatic conditions* were the worst experienced since the station has been in existence. Excessive heat ranging up to 116 degrees in the shade for days on end, combined with lack of rainfall and water, caused the usual irrigation and cultural methods to be carried out with extreme difficulty. Although over 23 inches of rain fell on 53 days precipitation principally occurred in the form of light showers, and consequently evaporation in the intense heat being extremely rapid, little benefit was received by the trees.

Irrigation.—Better facilities are needed here now that the trees are of good bearing age. Unless matters improve the best results cannot possibly be obtained. Notwithstanding the drawbacks some 400 cases of oranges were exported to England, and the results obtained were by no means unsatisfactory.

Manuring.—With the view of ascertaining the value of lime and potash as a means of reducing the thickness of the skins of certain types of oranges, applications of basic slag, muriate and sulphate of potash were made. Owing to lack of water the results can only be regarded as negative. Work in this connection will be continued.

Pests and Diseases.—Both California and Florida Red Scale have caused trouble but to no serious extent. Treatment by spraying with one of the Miscible oil products was effective as a scalecide, but the fruit received a certain amount of injury from spray marking. One Pomelo tree developed canker; this was immediately treated with Bordeaux mixture, and the disease checked at once. Its recrudescence after an absence of some six years is somewhat unaccountable, unless this tree was propagated by budding from an infected parent tree.

Buildings.—Repairs are needed to some of the existing buildings and an orange packing house must be provided for use next season.

Visitors.—Some hundreds of visitors inspected the Orchard during the year and much interest was expressed in the various features of work in progress. I consider that the district in particular, and possibly the country as a whole, as far as citrus culture is concerned, cannot fail to benefit by the existence of this the only station of its kind in the Union.

Results.—The results of experimental work in connection with testing of varieties were furnished in detail in the report of this Division for 1914-15—no further information under this heading is available, as no additional varieties have been under test sufficiently long to arrive at any definite conclusion regarding them. It may be as well to say that the following kinds of citrus and deciduous fruits have been found unsuitable for cultivation in the Waterberg district of the Transvaal and similar areas:—

Citrus.	*Remarks.*
Orange—Natal Victoria	Shy bearer of coarse large fruit.
Mandarin—Satsuma	Puffy—unsaleable.
,, Kino Kuni	Unsaleable.
,, Cleopatra	Fruit too small.
Lemons—Bijou (India)	Ill-shaped fruit—unsaleable.
Lime—Sweet (India)	No sale in Transvaal.

Deciduous.	*Remarks.*
Apricot—Breda	Shy bearer.
,, De Shiraz	,, ,,
,, Early Golden	,, ,,
Nectarines—Early Rivers	Refuse to bear.
,, Early Violet	
,, Lord Napier	
,, Large Red	
,, Rustenburg	
,, Rivers Orange	
,, Stanwick	
,, Victoria	
,, Cardinal	
Plums—Royal Hative	Never fruited.
,, Prune d'Agen	Very shy bearer.
,, Apple	,, ,, ,,
,, Nikko	Small sour fruit.
,, Yosobe	,, ,, ,,
Peaches—Berenice	Never fruited.
,, Brigg's Red May	,, ,,
,, Elberta	,, ,,
,, Oriole	Shy bearer.
,, Powell's Beauty	Never fruited.
,, Duke of Edinburgh	,, ,,

The following introductions have been made from Australia :—

Peaches.	*Plums.*
Hale's Early (New strain).	Sharp's Early.
Lippiatt's Late Red.	Omaha.
Wiggins.	
May Flower.	
Red Bird Cling.	

Experimental work with regard to stocks for citrus trees has been carried on for some time past, and is still receiving attention. The last report in detail was issued in 1914; copies were widely distributed. It is not advisable to issue information on this subject more frequently than in quinquennial periods, as it is felt that too much care cannot be given to this important matter, and the publication of any immature opinions might be misleading, and, therefore, unwise.

Revenue and Expenditure.—A statement of these is attached.

Itinerant Instruction.—Unfortunately this Division possesses only one officer of this type, and he is stationed in the Eastern portion of the Cape Province. His time is more than fully occupied, and work accumulates so that he is always in demand. During the year he visited 494 fruit-growers and farmers, attended 10 meetings of Agricultural Societies, gave 82 demonstrations in planting and pruning trees and packing fruit, and attended two agricultural shows. I am strongly of opinion that such work as is done by this officer is highly beneficial to the fruit-growing industry, far more so than lectures in towns and villages, which, as a rule, excite but little interest, and are often very poorly attended.

Climatic Conditions in the Eastern portion of the Cape Province have been rather better than last year on the whole. Some areas have continued to suffer from drought, and a certain amount of damage has been caused by hailstorms—fortunately this is an unusual experience there.

Crops.—Fair crops of oranges and apples are reported and satisfactory prices obtained. Export of the former fruit was seriously handicapped, both by shortage of cool chamber space on steamers and lack of packing boxes. The export apple business is still in its infancy.

Pineapples have not been a heavy crop.

The fruit and plants have suffered considerably from hot sun and drought respectively. These facts, in conjunction with a high local market, contribute to make the export of pines one of the smallest since the inception of the business.

Planting.—Considerable numbers of orange trees have been set out during the year. The favourite varieties seem to be Washington Navel and Valencia Late. No seedlings have been planted.

The apple runs the orange fairly close in the Eastern Cape, and many farmers have planted out orchards within the past year. Good apples can be grown over a large area, and as more attention is being paid to planting on correct methods, and such items as pruning and cultivating are now receiving more careful attention than formerly it is to be anticipated that a great improvement in both the quality and quantity of the output will be apparent within a few years.

Pineapples have been planted on a scale unprecedented in South Africa, the Langholm Estate alone having some 2,000,000 plants. These, of course, are intended mainly for export, but provision is being made for a canning factory to handle any surplus. There is also a cannery for both pines and other fruits under consideration at Grahamstown.

Other Fruits.—Interest has centred to a certain extent in the walnut and some few thousand of these trees, mostly of the "English" variety, have been planted. The olive has also some few supporters. Stone fruits have only received moderate support.

Pests and Diseases.—Red Scale is prevalent and difficult to control. Codling Moth is spreading, and may soon reach Bathurst, where many apples are grown.

Bitter Rot in apples has been less troublesome than in past years.

Black Heart in pineapples appears to be on the increase in some few plantations, and is worse at certain periods of the year.

No citrus Canker has so far been found.

The Government Fruit Inspector stationed at Cape Town reports that, notwithstanding the shortage of space on the steamers, some 47,000 more boxes of deciduous fruit were exported than during the previous season. The following figures may be interesting:—

Pears, 95,116 boxes; Grapes, 71,384; Peaches, 42,884; Plums, 27,090; Nectarines, 7,534; Apricots, 1,798; Melons, 861 packages; Mangoes, 276 boxes.

The principal districts contributing to these totals were: Paarl with over 115,000 boxes; Constantia, 62,724; Stellenbosch, 45,260; Worcester, 8,590; Ceres, 5,427.

He complains that packing of fruit and especially of grapes is too carelessly undertaken, and insufficient care is given to this most important work. No grapes, for instance, should be picked for export immediately after heavy rains, yet this practice is persisted in even though it invariably results in loss.

Owing to the inability of the Mail Steamers to carry all the fruit sent for export, the inspector inaugurated with the co-operation of the S.A.R. Administration a service of refrigerator cars to some of the larger towns in the Union; this relieved the congestion materially, and the service should be undoubtedly continued and developed to its utmost capacity. Citrus fruits were shipped from the port of Cape Town to the extent of some 40,000 boxes, of which approximately 33,000 contained oranges, nearly $\frac{7}{8}$ of which were seedlings. Some lemons and naartjes also were sent, the English market, however, demands oranges first, and does not yet appreciate S.A. mandarines and tangerines. The total exports of citrus fruit from Cape Town were made up of consignments as follows:—

Transvaal, 22,612 boxes; Cape Province, 18,246 boxes; Rhodesia, 165 boxes.

It should be stated that fruit from the last-named State was inspected in precisely the same manner as that from the Union.

Some districts continued to send fruit for export which was badly infested with scale insects; needless to say such fruit was not passed. The Inspector considers that for the season of 1917, for the export of citrus fruit alone, it would be necessary to utilize 1,000 tons of space in the cold chambers of the mail boats weekly.

Shortfalls under the following headings are most noticeable: pineapples, plums, apples, and are attributable in the first case to a period of drought and hot sun in the Cape, and the withdrawal of some of the principal growers from the ranks of exporters, owing to excellent prices being obtained within the Union. Plums were probably held back in favour of peaches, which show an increase over the previous year's shipments of some 16,000 boxes, whilst the apple can up to the present scarcely be regarded as one of our staple export fruits.

Increases over the previous years are found under the heading of peaches, pears and nectarines, the most noticeable being that of pears, of which some 38,000 more boxes were sent than in 1914-15.

EXPORTS OF CITRUS FRUITS (UNION).

The total amount, 56,506 boxes, is made up as follows:—Oranges, 40,113 boxes, equal to 2,228 cubic tons. Naartjes, 14,851 boxes; lemons, 1,284 boxes; grape fruit, 246 boxes; sundries, 12.

The shortfall here is, of course, entirely due to prevailing conditions in the shipping world, and amounts to some 16,000 boxes, as compared with the *highest previous* record. The condition of citrus fruits on arrival in England has shown a marked difference between that carried in cool chambers and that stowed in the ventilated holds of the steamers. In the first case little waste occurred, whilst in the second there are evidences of a loss of up to 50 per cent. of the fruit in certain consignments. This is largely due to the unsuitability of temperatures, but some allowance must be made in cases of bad packing and unduly prolonged time taken on the voyage. It may therefore be regarded that the use of cool chambers for export of Citrus Fruits is imperative. *War Conditions* alone are responsible for our reduced exports.

The Union Castle Company in response to a request for records to be kept of the temperatures maintained in the different parts of the cool chambers, kindly undertook the work on the R.M.S. "Saxon," which left Cape Town on January 27th, 1916, and demonstrated clearly that the temperature of the chambers in the immediate vicinity of the brine pipes did not differ from that in the centre of the chamber to the extent of 1 degree, in fact, during the greater portion of the voyage there were no variations to speak of between any of the four thermometers in use. Cool storage accommodation has, of course, been entirely inadequate for our requirements, and it is possible even after the war is over that with the largely increased production of fruit of all kinds, the enlarged carrying capacity of all the cool chambers of the steamers of the Union Castle Company's fleet will be insufficient to fill our needs. However, I am satisfied that the Company regard the carrying of fruit from a business standpoint, and that they will be prepared to find accommodation for all the fruit South Africa can produce.

Quite apart from the commercial aspect, I have always found the Steamship Company not only ready, but anxious to meet the views of the fruit exporting community in every possible way.

Imports of fruit and fruit products into the Union for the Calendar year 1915 are given, together with those of the two previous years.

IMPORTS AND EXPORTS OF FRUIT AND FRUIT PRODUCTS INTO AND FROM THE UNION.

	Calendar Years.					
	1913.		1914.		1915.	
Imports.	Lbs.	Value. £	Lbs.	Value. £	Lbs.	Value. £
Almonds	229,551	14,416	166,670	11,210	247,480	15,242
Currants and Raisins	1,639,037	23,926	1,478,428	21,617	1,370,073	23,579
Dates	3,110,638	23,772	1,375,171	9,387	2,943,489	27,396
Prunes	428,725	7,739	25,878	645	100,170	1,817
Other Dried Fruits	781,311	17,190	308,451	7,657	250,131	6,603
Walnuts	27,544	661	5,010	254	7,027	266
Other Nuts	354,483	9,875	317,119	7,843	424,188	10,291
Canned and Bottled Fruits	1,035,207	20,629	568,789	11,808	346,216	8,174
Fruit Pulp	116,935	1,915	130,140	2,081	106,059	1,612
Fruit Juices and Cordials	—	17,756	—	15,374	—	20,551
Fresh Fruits	—	28,633	—	16,277	—	7,915
Figs	304,632	3,948	147,869	2,622	88,250	1,507
Fresh Cocoa Nuts	—	2,595	—	2,375	—	2,987
Exports.						
Bottled and Tinned	8,388	181	5,537	150	187,556	3,422
Currants, Figs and Raisins	3,518	90	11,377	212	736,805	10,157
Dried Prunes	761	28	2,724	84	13,328	508
Other Dried Fruits	7,306	246	7,837	301	51,004	1,719
Nuts (Almonds and others)	1,742	50	1,246	40	8,126	294
Fresh Fruit	—	57,848	—	93,049	—	62,622
Grape Juice	—	59	—	100	—	200
Other Fruit Juices	—	—	—	59	—	654
including Citrus	Value	£13,747	Value	£19,820	Value	£24,415

The examination of the export figures supplied by the Customs Department affords food for thought. The increased imports of raisins (to the United Kingdom), show what might be done in that particular line if the business were properly tackled.

A good many adverse comments were made on the appearance and cleanliness of some of the samples received in England; on the other hand certain brands met with an immediate request for further consignments. It is hard to understand why uniformity of quality and grading cannot be secured.

Most of the other increases noted may be set down to exports to either Portuguese East Africa or the South-West Protectorate, principally the latter. Exports of citrus fruits amounted to three-eighths of the entire output.

The list of imports may be considered satisfactory in that it reveals a steady shrinkage; this is not entirely due to the war, but to a large extent to the ability of the country to supply its own requirements.

In reviewing the fresh fruit business as a whole it is impossible not to concede the fact that, notwithstanding the adverse conditions under which it is placed at present, there is very strong evidence of the stability and also the expansion of the industry. Placing the citrus fruits first, one finds evidence everywhere of the confidence placed in their production in very large quantities. Whenever it is possible, *i.e.*, where suitable land and water are obtainable throughout the length and breadth of the Union one can find young citrus orchards in various stages of progress. The output of oranges in a few years' time will need greatly enlarged accommodation on steamers for the satisfactory transport—by "satisfactory" it is to be understood—sufficient cool chamber space on each mail steamer to take away all fruit offered at the Docks weekly, and so do away with the objectionable practice of holding over from week to week. If this is provided in sufficient quantity for citrus fruits it follows that there is a sufficiency for all deciduous fruits, including grapes as well.

War prices for oranges have ranged from 14s. to 20s. and even 25s. for seedlings, and from 18s. to 35s. for Washington Navels. This is quite abnormal and cannot be expected to continue. Probably 8s. to 12s. for seedlings and 12s. to 18s. for Navels will prove to be normal figures as time goes on.

Pineapple export is likely to become of importance in the near future and will assume its largest proportions at the same period of the year as does the export of deciduous fruits from the Western Province. This addition to the volume of fruit to be handled it may be assumed will tend to fill up all the cool chamber space available.

Deciduous Fruits.—The increase in the export of these fruits, chiefly confined to the Western Province of the Cape, is phenomenal.

Each year sees considerable additions to the number of growers who specialise for the export market. Much care is given to the selection of suitable export varieties and packing and handling of the crop generally has reached such a state that the South African packing is regarded as second to none. There are of course instances of slackness but the general tendency is towards an annual improvement.

The development of oversea markets under the conditions above mentioned is a necessity. Not only the Continent of Europe but also America must be brought within the scope of our efforts and the outlay of considerable funds will have to be faced before these objects can be attained.

THE DRIED FRUIT INDUSTRY.

The character of our products in this line is good on the whole; much of the fruit, such as prunes, pears, apples, apricots and peaches will compare favourably with the best Californian article. Insufficient attention has been paid in the past to the planting of varieties of fruit which should be "general purpose varieties" *i.e.* kinds suitable for a little oversea and local business in addition to canning and drying. We still import too much dried fruit and there is lots of room for expansion in the volume of our business in this line.

The figures already quoted show an increase not only in export of prunes, but also of other dried fruits which is somewhat remarkable. Taking prunes first we find an increase of nearly six times the export of the previous year and a similar increase marks the dealings with other classes of dried fruits. The larger volume of business shown in the year past has its origin doubtless in war conditions, but the fact remains that South Africa has exported dried fruit in quantities considerably in excess of previous records and one enquires naturally why this increase should not be maintained. That this can be done there is little doubt, but whether it will or not is another matter.

The great factor in the prune industry in France is the small grower. Hundreds of these are to be found in the neighbourhood of Bordeaux each with comparatively few trees, in some cases less than fifty. Similar conditions exist in California where the prune and dried fruit business has reached colossal proportions. The holdings which supply the bulk of the drying fruits are on an average less than twenty acres in extent. Small cultivators as a rule can be relied on to produce a good class of fruit for drying or in fact any other purpose. It is an unfortunate fact that this class is only present to a very limited extent in those areas where the production of our dried fruit is carried on, and until some amelioration of the present conditions is afforded it is unlikely that such a class of growers will be found.

There are, however, signs of forward movement in the establishment of two up-to-date "Fruit Drying Companies" at Wellington, Cape Province, and the product they turn out is in many instances really first class. Sizing and grading of the fruit is attended to much on Californian lines and the processing and packing have shown great improvement in recent years.

It may be said perhaps that the increased output of dried fruit was due to the restricted export of deciduous fruits owing to lack of space, but this is only applicable in a few cases, such as peaches, pears and apricots. Much of the fruit grown for export is quite unsuitable for either drying or canning. The fundamental fact remains that our dried fruit export reached high water mark last season, and it should not be allowed to recede even though we lack the class of producers possessed by the before mentioned countries.

The Canned Fruit industry as a whole may be said to be in a healthy condition. A well-known English firm has commenced operations in the Eastern Cape and it is expected that further developments, especially in connection with pineapples will shortly take place. In order to make success in this business more assured the price of South African canned fruits in retail stores should be considerably reduced.

WORK OF CHIEF OF DIVISION.

I was absent from Pretoria 188 days out of the year on duties of all kinds including extended trips with the Trades Commissioner from London, in the course of which we both lectured at various Citrus growing centres from Upington to East London.

Judging at Shows, attending Conferences and assisting the various Agricultural Schools in inspection duty, together with lectures on subjects connected with fruit growing (principally with regard to oranges) all go to make up the toll of days given to itinerant work. As a consequence there has always been an accumulation of work in the office. As soon as this has been dealt with, another journey has been necessary and so the year has gone by and some things I anticipated doing are still undone. I refer specially to publications. Approximately 3,600 letters have been despatched and some 300 telegrams. I hope to be able to give more time to the public by means of reading matter during the coming year.

I desire to call attention to the services rendered by the different members of my staff and especially those of the Fruit Inspector at Cape Town. All have worked with assiduity and loyalty.

The services of the Plant Inspector at Port Elizabeth, Durban and East London, as also those of the Collector of Customs at Mossel Bay, have been cheerfully and I may add, gratuitously rendered.

In conclusion, my thanks are due to my colleagues in the Agricultural Department who have at all times been willing when called upon, to render me whatever assistance lay in their power.

R. A. DAVIS,
Chief, Division of Horticulture.

ANNEXURE. WARMBATHS HORTICULTURAL EXPERIMENT STATION.—Statement of Receipts and Expenditure for the year ended 31/3/1916.

RECEIPTS.			EXPENDITURE.	
Sales of Fruit		£496 8 5	Administrative Charges, £465 10s. 7d. :—	
Sales of Seeds and Scions		3 5 5	Salaries and Allowances	£440 0 0
Sales of Mules		5 0 0	Transport and Travelling	25 10 7
Sales of Empty Tins		2 19 10	General, £454 0s. 1d. :—	
			Wages	172 18 1
			Sundry Equipment	34 3 4
			Sundry Stores	10 3 9
			Seed and Fruit Trees	7 7 6
			Sprays, Manures, etc.	53 13 7
			Feeding Stuffs	12 4 3
			Fruit Boxes	51 19 3
			Railage	93 15 8
			Incidentals	17 14 8
Total Actual Receipts		£507 13 8		£919 10 8
Transfers :—				
Fruit	£0 15 0	1 5 11		
Scions and Seeds	0 10 11			
		£508 19 7		£919 10 8

APPENDIX VIII.

GOVERNMENT VITICULTURIST.

ANNUAL REPORT, 1915-16.

During the year under review the work was carried out under difficulties, as I was without a technical assistant during the whole period.

Oenological Institute, Elsenburg.

General.—The Institute is now completed, and is stocked with a fair supply of the necessary instruments, etc. The fittings which were of a temporary nature, are now replaced by permanent ones at the time of writing. The Mansfield gas plant is working satisfactorily. In order to burn Mansfield gas in Bunsen burners, the gasometer is filled barely two-thirds with gas, and is then allowed to suck in air until it is full. In this way a gas is obtained, that burns well in Bunsen burners and gives sufficient heat for the purposes of the Institute.

Short Course in Wine-making.—The first course of this nature was held in this Institute from the 10th to the 15th January, 1916, and was attended by 38 farmers. Mr. S. W. van Niekerk, Lecturer in Viticulture and Wine-making at Elsenburg, and myself gave the lectures, together with some practical instruction in simple wine analysis. Those attending were wine farmers and in some cases their sons, together with some young men engaged in the wine trade. Most useful instruction was given, and those attending the course were very enthusiastic about it. It is intended to hold this course each year at about the same time in future. From personal visits subsequently paid to some who attended the course, the first fruits of the instruction thus received were already noticeable.

Cape Wine Levures.—During the vintages of 1914, '15, and '16 the following numbers of bottles of pure levures were respectively applied for by, and supplied to farmers: 33, 80, and 135. It will thus be noticed that during the 1916 vintage more bottles were sent out than during the two preceding years. This is a most satisfactory state of affairs, and is largely due to the more extensive use made of it by those who attended the wine-making course in January. The use of these levures has in all cases been attended with good results, so that I feel confident that, as the advantage to be gained by a rational use of these levures becomes better known amongst wine farmers, there will be an always increasing demand for a number of years to come. During 1916-17 further researches will be carried out with these levures.

Analytical Work.—Owing to the lack of assistance and a complete absence of gas until nearly the end of 1915, very little analytical work could be undertaken during the year under review. At present this work is progressing favourably with the assistance of the Laboratory Assistant recently appointed. The testing of total acidity in wine and grape vinegars at 6d. per sample, and the determination of acetic acid in such vinegars at 4s. per sample, will now be carried out in the Institute. Some diseased vines and wines were submitted by farmers and reported upon.

Correspondence.—This part of the work is still growing. In all 835 letters have been received and 822 despatched during the period under review, thus making a total of 1,657, as against 1,055 during the previous year.

Publications.—Three articles were written and published. "Almeria Grapes," "Vine Trellising," and "Viticulture in South Africa"; the last-mentioned was published by the International Institute of Agriculture, Rome.

Staff.—At present I have one assistant for both the chemical and bacteriological work. As soon as possible a second assistant should be available, so that there would be an assistant for each section of work. This will be absolutely necessary if any serious research work is to be undertaken. It is impossible for one man to do justice to both phases of the work.

Outside Work.

Lectures.—The following Lectures were given:—

a. 6 Lectures to short course students at Elsenburg during the winter vacation of 1915.
b. "Almeria Grapes," before Paarl Farmers' Association, 31st August; attendance, 40.
c. "Bacteriology of Wine," Constantia, 4th November.
d. "Manuring of Vines," Villiersdorp, 11th November; attendance, 150.
e. "Table Grapes," before Paarl Farmers' Association, 24th January: attendance, 35.

Visits.—During the year under review 110 visits to farmers and others were made, to give advice on viticultural matters.

American Stocks. The 17 experimental plantations of American stocks have now mostly been grafted over with different varieties of grapes. It is yet too early to say anything about the results, but in the Karroo district the variety known as "1202" is the most vigorous grower. It is closely followed by Rupestris du Lot, after which come Aramon x Rup. Ganzin No. 1, Aramon x Rup. Ganzin No. 2, and Rip. x Rup. 101-14. A few experiments with American stocks laid down 8 years ago in Karroo soil in the Robertson district are in perfect agreement with the above results, and that is why they are mentioned at this stage.

VITICULTURAL EXPERIMENT STATION, PAARL.

Ampelographic Collection.—This now comprises about 200 varieties of wine and table grapes. Most valuable information has been collected on the properties and qualities of the different varieties. Their value for winemaking or for export to the oversea or English markets is being studied. The early season in Paarl makes it possible to grow both early and late varieties successfully. This makes the existence of the Experimental Station so valuable to viticulturists.

Manurial Experiments.—These are being continued and results noted.

Winemaking Experiments.—These experiments have been continued. Most satisfactory results have thus far been obtained in the making of wine brandy (Cognac type), Port wine, light white wine (Hock type), and Sherries.

Sales of Table Grapes.—During the 1916 grape season 191 ten-pound boxes of table grapes were sold on the Johannesburg market. 155 boxes sold between 1st February and 25th March fetched an average price of 3s. 4d. per box. 36 (10 lbs.) boxes Almeria grapes, sold between 20th June, 1916, and 29th August, 1916, fetched an average price of 5s. 3d. per box.

Further, 185 standard 10 lbs. boxes of 30 varieties of table grapes were exported and sold on Convent Garden market. The Trades Commissioner reported fully upon each consignment, and most valuable results have thus been obtained, bearing upon present and new varieties of table grapes for export.

Thinning of Table Grapes for export was carefully carried out. In the case of the good varieties, the average number of berries removed was from 42 per cent. to 53 per cent.

Further experiments were conducted on *Sunburning.*—The fish-spine method and high trellising were most effective in preventing this trouble.

Stock of Wines and Brandy on hand, 31st March, 1916.

1911.	Sherry	1	hogshead	valued at	£5	0	0
1912.	,, (sweetish)	½	,,	,,	3	0	0
	,, (dry)	½	,,	,,	3	0	0
	,, (Stein)	¾	,,	,,	4	10	0
	Fransdruif	1	,,	,,	5	0	0
	,,	300	bottles	,,	7	10	0
1913.	Dry Wine	1	hogshead	,,	3	0	0
1914.	Pedro Sherry	¾	,,	,,	4	10	0
1915.	Sherry (greengrape)	250	gallons	,,	16	0	0
	,, (Pedro)	50	,,	,,	3	4	0
	Riesling	1	hogshead	,,	4	0	0
	Jeripico	40	gallons	,,	4	0	0
	Mixed Wine	40	,,	,,	1	10	0
	Claret	1	hogshead	,,	4	0	0
	Fransdruif	220	gallons	,,	17	6	0
	Port	264	,,	,,	26	0	0
	Pontac	1	halfaum	,,	1	0	0
1916.	Fransdruif	240	gallons	,,	11	10	0
	Riesling	228	,,	,,	10	15	0
	Stein	240	,,		11	10	0
	Greengrape	720	,,	,,	34	0	0
	Sherry	170	,,	,,	9	7	0
	Claret	410	,,	,,	20	0	0
	Port	4½	leaguer	,,	54	0	0
	Mixed Red Wine	1	,,	,,	5	0	0
	,, White Wine	1½	,,	,,	7	10	0
1914.	Brandy	24	gallons	,,	12	0	0
					£288	2	0

GENERAL.

The 1916 vintage was fairly good. The price of wine was good. Prices started at about £4, and soon went up to £5 per leaguer. There has been a steady upward tendency. In August distilling wine stood at £6, and good wine at about £7 per leaguer. Fairly extensive vineyards have been and are still being planted. If an export trade can be established, there is a great future for the wine industry. Failing this, we shall ere long begin to suffer from over-production, unless something is done in time for a better distribution and regulation of the sale of wine and brandy in this country. It is particularly necessary to put a stop to the unfair way in which the retail dealers favour imported spirits over the home-made article.

Had it not been for the very limited shipping facilities, we would this season have had a big increase in the exportation of table grapes. This branch of the industry is going forward with leaps and bounds. Some of the best varieties of table grapes for export, which I have in recent years imported, propagated and tested at the Paarl Viticultural Station, are now being cultivated by exporters. This will yet become a very big industry, and the Government will do well to consider means of getting direct shipments from Cape Town to Great Britain, the Continent of Europe, and New York. After the war we should systematically cultivate markets for our export grapes (and other fruit) also in Europe and North America, in order to avoid glutting Covent Garden market by sending too much stuff thither.

REVENUE.

The Revenue of the Paarl Viticultural Station during the year under review amounted to £139 7s. 11d. During the current financial year it will probably amount to quite £250, which would mean that the revenue will more than balance the expenditure, exclusive of the Foreman's salary. This does not often happen with experiment stations. It is due, in the first place, to the excellent and economical management of the Foreman, the increased production from the young plantations coming into bearing, and the diminished expenditure on trenching and trellissing, which have now been practically completed.

A. I. PEROLD,
Government Viticulturist.

ANNEXURE. PAARL VITICULTURAL STATION. Working Account for the year ended 31/3/1916.

Value of Wine on hand at 1.4.15	£251	13	6	Administrative Charges: Salaries and Allowances	£120	0	0
Sales, £139 7s. 11d. :—				General :—			
Sales of Wine	100	18	5	Wages	144	18	4
Sales of Vine Cuttings	18	18	6	Sundry Equipment	19	11	6
Sales of Grapes	19	11	0	Sundry Stores	11	2	7
Balance being Loss on Working Account ..	294	10	7	Fruit Boxes	4	7	0
				Wine Cases, Bottles, etc.	53	18	9
				Sprays, Manures, etc.	12	14	9
				Fencing	15	11	6
				Railage	7	1	11
				Sundries	7	5	8
				Free Issues : Grape Baskets	3	12	0
				Wine on hand 31.3.16	285	8	0
	£685	12	0		£685	12	0

APPENDIX IX.

GOVERNMENT WINE FARM, CONSTANTIA.

ANNUAL REPORT, 1915-16.

The Staff during this period consisted of, in addition to the Manager, a clerical assistant and one outside assistant, who was temporarily appointed. The labourers employed were 3 monthly-paid and 5 daily-paid, the average attendance of the monthly-paid men being 2·6, and of the daily-paid 4·2. In addition to these, two spans of convicts were employed whose average daily attendance was 17. The monthly-paid men have since been reduced to 2, and the daily-paid to 4.

Each span of convicts consists of from 10 to 14 units, and in numbers would appear excessive, but in quality the labour is of an extremely low grade. These units work on an average only about 8 hours per day, and not being housed on the premises some time is spent in marching to and from Tokai.

In December the temporary Assistant was replaced by Mr. L. C. Versfeld, one of the selected students sent to Europe by the Cape Government in 1907, to study Viticulture. Mr. Versfeld was appointed Assistant Manager with a view to assuming the management in the future, owing to the resignation of the present Manager, who now is serving under contract. This arrangement may to a great extent ensure a continuance of a definite policy, the non-continuance of which in the past is reflected in the curious designs in the Horticultural architecture of the Estate. For example, sites suited only for vineyards, are found to be occupied by fruit trees as well, the latter furnishing neither pecuniary nor experimental benefits of any kind, and on the contrary are expensive dependents.

Other sites placed there by nature, to give us, with the suitable climate, the best of wines, are occupied by struggling Peach trees, which are meant for richer soils.

The Revenue Receipts amounted to £1,402 2s. 10d., being somewhat less than the previous year's total. The amount estimated to be received for the sale of American stocks was not nearly reached, as there was no demand for them, owing to the low prices of wine. The wine sales were also somewhat lower. Fruit sales came quite up to the Estimate. The Expenditure ran up to £1,696 7s. 0d., all attempts being made to keep it as low as possible; to balance this wines might have been sold in bulk, but this was not considered advisable in view of the prices prevailing, and also the inadvisability of putting wine on the market when producers were not benefiting by high prices.

Vintage, 1916.—Wine making commenced very much earlier than usual. Crushing operations took place on the 22nd February, whereas usually they start during the second week in March.

This early maturity of the grape, though abnormal, is not to be wondered at considering the Meteorological conditions which prevailed at the time. During December there were six days on which rain fell, but the amount for the month was only 0·53. In January rain fell on two days, totalling 1·65 inches. In February again we had six days of wet at intervals, but only 0·70 inches of rain, and these conditions, combined with the drying South East wind, hastened ripening.

The above conditions were not as bad as in 1915, when during the last two months no rain fell at all. Reasonable precautions were however taken whereby high sugar contents were avoided for the usual Light wines by early pressing, and consequently most promising Light White and Red wines have been obtained.

The heavier Red wines were pressed later. On the whole, as conditions were most favourable, good wines have been obtained, and the 1916 vintage should be ranked among the good ones.

The yields of the different kinds were as follows, viz.:—

Hermitage-Cabernet blends	3,345		gallons.
Sauvignon Blanc	2,230		,,
Press Wine	2,185		,,
Port	580		,,
Constantia Berg	778		,,
Sweet Constantia	646		,,
Pedro Ximenes	85		,,
Pontac	50		,,
	——	9,899	,,

An increase in the Port bulk has resulted from the newly-planted varieties, and the importation of these has been quite justified for good results are assured. Only a few applications for scions have been made and this is disappointing. There is a large demand for Ports in this country, and viticulturists will be well advised to propagate the best varieties, there being most suitable districts up-country for these wines. A great demand exists in England at present, and for future exports no more suitable kind could be planted. Australia, like in most ventures, is pushing on with Ports with a view to export, while our vine-growers are sticking to the old types, which mostly are only fit for the production of alcohol. It is hoped that by the efforts of the newly-formed Viticultural Union, producers will waken up to obtaining quality on a large scale. At the present moment, when this country is only discussing preliminaries in connection with an export trade, California, which has admitted the superiority of our wines, is selling Hocks in London.

In quality the wines made in the Estate in 1916 are very satisfactory, and in quantity the return exceeds that of 1915 by some four hundred gallons, the figures being respectively: 1915—9,485 gallons; 1916 9,899 gallons.

Vineyards.—In certain respects the returns from the vineyards have really not been up to expectations, and the remedy lies in a rational system of manuring. Much sustenance in the form of plant food is required in order to sustain health when the vine has to resist Phylloxera attacks and also yield fruit of a composition that can be turned into a wine of character. Up to the present it has been the practice to supply sustenance in the form of stable manure, in conjunction with Phosphates and lime, once in three years in order to obtain that chemical balance of the constituents of the must necessary for good wines. The amount of stable manure applied was at the rate of one bushel basket for every four vines. This gave good results for two years, but generally the third year the crop and vine appeared to go back somewhat, though the composition of the must was good. When an excess of the manure was applied, a large crop of watery fruit resulted for the first year, and gradually worked down to normal conditions. Now, following upon the experience of other countries, it has been found that to ensure normal crops and fruit of normal content, it is advisable for the health of the vine and the producer's benefit to apply less manure, but more frequently, consequently stable manures are now applied every two years, while the mineral fertilisers may still be applied every third year. This frequent application is due to the double function falling to the lot of the American stock, namely resisting insect attacks, and supporting the scion.

These remarks do not apply to all situations, but mostly to soil poor in organic substance, such as the red hillside loams.

Callandras (Phlyctinus Callosus) invaded the vineyards in appalling numbers, and most serious damage was done to some vineyards. This after an almost absolute immunity for some six years. The usual methods of destruction were employed.

Oidium was rather bad in some blocks of Cabernet at times during the season, which called for constant attention.

The demand for American stocks was the lowest for many years, due no doubt to the depression of the wine market. In all only 34,800 sticks were distributed, as compared with over 103,000 in 1914. The former comprised 1,000 Metallica, 7,000 Jacquez, 25,500 Aramon; 300 "101-14"; 1,000 "44-01."

Orchards.—These are all round in a far more satisfactory condition, and fruits of the finest quality were borne. Owing to the restricted space on steamers for export fruit the peaches were sold locally at satisfactory prices. Pears were marketed in the Union. The returns from the orchards amounted to nearly £500. All diseases were kept well in hand. The one pest for which no preventive measures are known, namely Antestia bug, was not present in large numbers, hence no damage resulted from them.

A six months' supply of animal rations was harvested, and it appears desirable to extend areas for this purpose as it amounts to a great saving of expenditure.

Two students were in residence for a period of a year, but these departed on account of the war. A scheme is under consideration for taking youths of the country, whose financial position debars them from obtaining a training at an Agricultural School, as apprentices for a term of years with the intention of training them for the management of farms. If successful, a great want in the country will be supplied, for it is with the greatest difficulty that men can be found to take on the management of wine and fruit farms, possessing the requisite knowledge for all its branches. In Europe at most of the Institutions which the writer visited, provision is made for training even the agricultural labourer, in order to fit him for his future in life, and for the benefit of his country. It is also sought by this scheme to elevate that class of person who may otherwise ultimately flow towards the ranks of that pitiable class—the poor whites.

The idea is to commence with 20 apprentices. These boys will eventually perform all the necessary farm work when the present labourers, convicts and free men, will be dispensed with.

T. P. WATERMEYER,

Manager.

ANNEXURE TO APPENDIX IX. GOVERNMENT WINE FARM, CONSTANTIA.

(*a*) REVENUE PRODUCING CAPITAL ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 1916.

To :—	£	s.	d.	By :—	£	s.	d.
Balance 1.4.15—£16,807 19s. 10d. :—				Depreciation as per Profit & Loss Acct.	£202	11	3
Purchase of Farm	£5,312	19	9	Balance 31.3.16—£16,605 8s. 7d. :—			
Buildings and Additions	4,442	5	7	Purchase of Farm	5,312	19	9
Fustage	5.512	9	0	Buildings and Additions	4,349	14	9
Cellar Apparatus and Machinery	971	10	11	Fustage	5,456	4	1
New Vineyards and Trellising	568	14	7	Cellar Apparatus and Machinery	917	15	5
				New Vineyards and Trellising	568	14	7
	£16,807	19	10		£16.807	19	10

(*b*) NON-REVENUE PRODUCING CAPITAL ACCOUNT.

Balance 1.4.15—£10,863 11s. 4d. :—	£	s.	d.	By :—	£	s.	d.
Furniture	1,281	13	7	Balance at 31.3.16	10,863	11	4
Fustage (Exhibition)	350	0	0				
New Cellarage	9,231	17	9				
	£10,863	11	4		£10,863	11	4

(*c*) BALANCE SHEET.

Liabilities.	£	s.	d.	*Assets.*	£	s.	d.
Sundry Creditors	37	5	3	Farm	5,312	19	9
Capital Account	31,517	2	11	Buildings	4,349	14	9
				Fustage	5,456	4	1
				Cellar Apparatus and Machinery	917	15	5
				New Vine and Trellising	568	14	7
				Wines and Spirits	14,756	9	1
				Trading Stock	192	10	6
	£31,554	8	2		£31,554	8	2

(*d*) WORKING ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 1916.

Stock on hand 1.4.15—£15,090 8s. 8d. :—	£	s.	d.	Revenue—£1,398 9s. 0d. :—	£	s.	d.
Wines and Spirits	14,543	5	8	Sales of Wine	860	12	2
Trading Stock	547	3	0	Sales of Argol	6	6	11
Administrative Charges—£831 6s. 4d. :—				Sales of Fruit	305	11	3
Salaries and Allowances	670	8	10	Sales of Vines	21	12	6
Transport and Travelling	2	11	0	Sales of Wood	2	1	6
Rations to Staff Students	158	6	6	Sales of Acorns	6	8	0
				Sales of Carbon Bisulphide	59	10	6
General—£959 15s. 5d. :—				Sales of Cattle	9	0	0
Wages	637	15	4	Fees for Rations	127	6	2
Working Expenses	322	0	1	Wines consigned to Agents not yet paid for (less Discount)	166	6	7
Free Issues—Guano	15	0	0	Free Issues—£404 1s. 0d. :—			
				Wines etc.	4	11	0
				Carbon Bisulphide	399	10	0
				Stock on hand 31.3.16—£14,948 19s. 7d. :—			
				Wines and Spirits	14,756	9	1
Balance, being gross profit	21	5	9	Trading Stock	192	10	6
	£16,917	16	2		£16,917	16	2

(*e*) PROFIT AND LOSS ACCOUNT.

Depreciation—£202 11s. 3d. :—	£	s.	d.		£	s.	d.
On Buildings, 2%	92	10	10	Balance from Working Account	21	5	9
On Fustage, 1%	56	4	11	Balance, being loss for year	1,456	4	0
On Machinery, 5%	53	15	6				
Interest at 4% on Capital (£31,873 3s. 10d.)	1,274	18	6				
	£1,477	9	9		£1,477	9	9

APPENDIX X.

DIVISION OF ENTOMOLOGY.

ANNUAL REPORT, 1915-16.

1. *Prefatory Note.*—A report for the year 1st April, 1914—31st March, 1915 was prepared but laid before Parliament in typescript in common with the reports for other divisions of the Department of Agriculture; and as it is certain now that that report will not be published, the present report is made to include certain data from it that it is desired should be in a convenient form to refer to in after years.

2. *The duties of the Division* comprise (1) the dissemination of advice on insect problems; (2) the practical application of the Government regulations concerning (a) suppression of locusts, (b) inspection of nurseries, (c) plant, fruit, and apiary imports, (d) restrictions on the conveyance of plants; (3) experiments and demonstrations in insect control; and, what is of the greatest permanent value, (4) studies to acquire precise information on the habits and characteristics of economically important insects in order that, whether beneficial or injurious, they may be dealt with efficiently. During the year under review duties in connection with the suppression of migratory locusts have preponderated.

3. *Staff.*—The personnel of the staff and the duties and headquarters of the several members remained as detailed in the report for 1913-1914 except that Entomologist C. K. Brain was added to the staff at Pretoria in July, 1914. He is utilized for scale insect studies in particular and miscellaneous technical work in general. There are now eight entomologists and assistant entomologists in the Division.

4. The main office of the Division is at 228, Wessels Street, Pretoria, and here eight technical and general officers are located. The principal branch office, in charge of Entomologist C. W. Mally, is in Parliament Street, Cape Town, where four officers have headquarters. Entomologist J. C. Faure is stationed in the Government Buildings, Bloemfontein, for general duties; and two, engaged in specific wattle insect studies, are stationed at New Hanover, Natal. Plant inspectors are stationed at Johannesburg, Durban, Port Elizabeth and East London.

5. The Division is now better staffed with technical officers than in former years, but the staff is still too small to admit of attention to many highly important subjects upon which there is really pressing need for more definite knowledge. Unfortunately no more young men from South Africa are being fitted by special study oversea to take up posts in the Division. Four of the present staff were aided in obtaining their special education by Government scholarships granted conditional on the acceptance of employment with the Department; and the advantages, under South African conditions, of this means of recruiting officers are so very decided that it would only be under quite exceptional circumstances I would in future be able to recommend the filling of a post by a specially imported man. I would urge that at least one entomological scholarship a year be granted with the object of providing recruits for the Division. The most unsatisfactory feature of the organization of the Division in the past year was that the inspection work at the ports, chiefly that of plants introduced from oversea, continued of necessity to be entrusted to officers who had no technical knowledge of insects and plant diseases. It is highly desirable that these plant inspectors be gradually replaced by entomologists and it is satisfactory to note that since the year closed it has been found possible to have an entomologist take the place of the one at Durban on the latter's retirement because of his age.

6. The writer was absent from office on leave for eight to nine months of the year, at first owing to illness and later on holiday leave to recuperate. Advantage of the freedom was taken to visit parts of Australia and America, where much information of value in connection with official matters was acquired. During my long absence the work of the Division was ably carried on by the Assistant Chief, Mr. Claude Fuller. Mr. S. M. Wood, assistant at the Cape Branch, was absent on military service for nearly the whole period, and Mr. J. Brenchley, of the clerical staff at Pretoria, was absent in the same cause for four months of the year. Both these officers now hold commissions with forces in Europe. J. Pringle, messenger of the Pretoria office, was also on military service for four months of the year.

7. The several absences noted hampered the Division in its ordinary work, but not nearly so seriously as an outbreak of the migratory Brown Locust which for several months occupied most of the Pretoria staff almost to the exclusion of other duties and on which Entomologist Faure was kept engaged practically the whole year. There is little about locust suppression work that demands the attention of officers with entomological attainments and it is regrettable that circumstances necessitate their being employed on it. As matters are, the Government appears to have no good alternative to entrusting such matters to the Division, and the Division must do the best it can with the forces at its disposal.

8. *Expenditure.*—The appropriations for the Division and the expenditure entered against the several items for the two years were as follow:—

Service.	1914-1915.		1915-1916.	
	Vote.	Expenditure.	Vote.	Expenditure.
	£	£	£	£
Salaries, Wages and Allowances	8,924	8,628	9,003	9.054
Transport and Travelling	1,800	1,161	1,400	1,753
Grant-in-aid, Imperial Entomological Bureau ..	350	350	350	350
Labour, Equipment, etc., in connection with administration of Agricultural Pests Act..	200	205	150	9,080
Potato and Plant Inspection at Ports, including labour and railage	3,000	326	450	271
Educational and Demonstrational work	150	52	—	—
Incidental Expenses	500	547	500	406

The excess expenditure for travelling and in connection with the Agricultural Pests Act during 1915-1916 was due to locust suppression expenses; and the decline in the expenditure for potato and plant inspection services was due to the falling off in potato imports brought about by the war.

9. *Revenue.*—The gross revenue (unaudited) of the Division from fees levied in accordance with regulations was as follows for two years and for the previous (pre-war) year:

Source.	1913-1914.	1914-1915.	1915-1916.
Fumigation of Imported Potatoes :	£	£	£
Cape Town	1,555	272	317
Durban	1,403	262	163
Port Elizabeth	708	263	272
East London	1,011	90	38
Mossel Bay	99	19	6
Fumigation of Imported Plants	84	41	46
Fumigation of Inland Plants	17	37	34
Sale of Vedalia Ladybirds	4	1	4
Inspection of Quarantined Nurseries	9	12	12
Total	4,890	997	892

The tremendous falling off in revenue was entirely due to events connected with the war. It was associated with a considerable decrease in expenditure but not a proportionate decrease as the salaries of the inspectors remain as before and as the equipment has to be maintained.

10. *Correspondence.*—The number of separately registered outgoing letters from the Pretoria office for the year was 3,978. The number for the previous year was 4,103 and for the year 1913-1914, 4,767. The falling off has been due directly and indirectly to two causes, the war and the locust invasion, and in respect of letters in reply to enquiries about insects it has been more serious than the figures indicate since the figures for the past year are much swollen by locust correspondence. Both causes have acted largely through restricting farm to farm visits and the attendance of officers at farmers' meetings, it being very noticeable that the personal contact of officers with farmers stimulates correspondence. The figures given include replies to all insect correspondence but represent only a fraction of the typed communications despatched, particularly concerning locusts, as those of a circular nature, acknowledgments, etc., are not numbered. The telegrams despatched numbered 559 against 256 in the previous year, urgent messages respecting locust matters accounting for the increase.

11. *Publications.*—The non-publication of the report for 1914-1915 and the convenience of having for reference in the printed report of the Division a complete list of its papers and other publications that are of more than temporary interest prompts me to have the following list cover the two years:

Title.	Writer.	How Published.
Sweet Potato Sphinx	J. C. Faure	Un. Agr. Jnl. vii 515-519
Locust Birds	F. Thomsen	,, 682-683
Bee Moth Superstition	J. C. Faure	,, 688-691
Locust Destruction	C. P. Lounsbury	,, 706-708
Skin Maggot of Man	C. Fuller	,, 866-874
Prickly Pear & Wild Cochineal	C. P. Lounsbury	Un. Agr. Jnl. viii 5-7
Warble Flies	C. P. Lounsbury	,, 61-64
Aloe Gall	C. B. Hardenberg	,, 70-72
False Codling Moth	A. Kelly	,, 72-75
Habit of Pepper Tree Caterpillar	J. C. Faure	,, 75-76
Notes: Sodium fluoride for Cockroaches; Locusts: Phylloxera in Transvaal	C. P. Lounsbury	,, 76-78
Harpuisbos Sprinkhaan	C. W. Mally	,, 78
Pumpkin Stem Borer	C. Fuller	,, 238-242
Bindweed Gall-maker	C. Fuller	,, 242-244
Rules and Regulations governing Introduction of Plants	Division	Dept. Leaflet, 10 pages.
Restriction on Conveyance of Plants, etc.	Division	,, 24 pages.
Scale Insects	C. P. Lounsbury	Agr. Jnl. So. Afr. I 29-33
Phoracantha Beetle	C. P. Lounsbury	,, 150-161
Cyanide for Fumigation Purposes	C. P. Lounsbury	,, 300-305
Plant Killing Insects: The Indian Cochineal	C. P. Lounsbury	,, 537-543
Poisoned Bait for House Fly	C. W. Mally	So. Afr. Jnl. Sci. xi 321-328
Some Phases of the Locust Problem	C. P. Lounsbury	So. Afr. Jnl. Sci. xii 33-45
Termite Economy	C. Fuller	,, 60-64
Anhydrous Liquid Hydrocyanic Acid for fumigation	C. W. Mally	,, 95-96
Weevilly Grain, Peas and Beans	C. Fuller	Farm. Weekly Reprint, 4 pages.
The Codling Moth	J. C. Faure	,, 5 ,,
The House Fly	C. W. Mally	,, 9 ,,
The Fowl Tick	C. K. Brain	S.A. Poul. Mag. Reprint, 4 pages.
Remedies and Advice	Division	Dept. Sheet, 21″ x 36″
Locust Destruction	Division	Dept. Leaflet 75, 1915, 8 pp.
Mally Fruit Fly Remedy	Division	,, 83, 1915, 8 pp.
Register of Nurseries, 1915-1916	Division	,, 10 pp.
Potato Ladybird	D. Gunn	,, 6, 1916, 7 pp.
Plum Slug Caterpillar	D. Gunn	,, 7, 1916, 7 pp.
Some Destructive Fruit and Flower Beetles: New Insect Pest of Peach	D. Gunn	,, 8, 1916, 8 pp.
Cucumber and Vegetable Marrow Fly	D. Gunn	,, 9, 1916, 6 pp.
Observations on some South African Termites	C. Fuller	Ann. Natal Mus. III, pt. 2, 329-504
Coccidae of South Africa, I	C. K. Brain	Trans. Roy. Soc. So. Afr. V, pt. 2, 65-194

12. *Nursery Inspection.*—Nursery inspection is a prominent and important feature of the Division's work. It takes practically the whole time of two field officers, perhaps one-fourth of the time of two others—the plant inspectors at Johannesburg and Pretoria, and a small share of the time of a number of further officers, aside from requiring no inconsiderable amount of attention from the Chief of the Division and the clerical staff. All things considered the inspection service is probably as reliable for the detection of diseases and pests as it is practicable to have such a service, the experience of the senior inspector and his chief assistant largely offsetting what they lack in technical knowledge of say fungi and bacteria. The fundamental idea of the nursery inspection, as it is conducted, is to check the dissemination of economically important diseases from which the stock after planting out might long remain free were it clean when it left the nursery. The inspection therefore chiefly concerns relatively slow-spreading insects and plant diseases that depend largely on the removal of living plants for their spread from place to place.

13. Nurserymen were given notice in the year reviewed that the presence of any insect named hereunder would render their premises liable to quarantine:—

Pernicious Scale (*Aspidiotus perniciosus*).
Grey Scale (*Aspidiotus africanus*).
Spanish Red Scale (*Aspidiotus dictyospermi*).
Red Scale (*Chrysomphalus aurantii*).
Ross Scale (*Chrysomphalus rossi*).
Circular Purple Scale (*Chrysomphalus aonidum*).
Mussel Purple Scale (*Lepidosaphes becki*).
Long Scale (*Lepidosaphes gloveri*).
White Peach Scale (*Aulacaspis pentagona*).
Chaff Scale (*Parlatoria pergandei*).
Araucaria Scale (*Eriococcus araucariae*).
Araucaria mealy bug (*Pseudococcus aurilanatus*).
Pustular Oak Scale (*Asterolecanium variolosum*).
Woolly Aphis (*Schizoneura lanigera*).

They were warned against the sale of any plants with roots affected by Crown Gall or Root Gall Worm (*Heterodera*), which troubles may pass unnoticed at inspection as the roots cannot be inspected. No quarantine, they were informed, would be imposed for such insects as winged plant bugs, widely distributed leaf feeding caterpillars, codling moth, fruit fly, and other troubles not largely dependent upon the movements of plants for their dispersion; nor for most species of aphides, pear slug, Australian bug, common soft scale (*L. hesperidum*) greedy scale, oleander scale, black scale, ants, citrus psylla, blue-gum psylla, bryobia mite, pear leaf blister mite, nor for most insects that confine their attack to greenhouse plants, provided that the inspector was satisfied that reasonable diligence was being exercised for the suppression of these troubles; and, further, that except after notice to nurserymen in general a quarantine would not be imposed for any other pest unless one deemed of exceptional gravity was discovered. This notification is indicative of the policy of the Division in respect of the kinds of troubles because of which restrictions are imposed. The removal of any stock from a quarantined area is illegal, and a quarantine remains in force until, on further inspection, the cause for it is found to no longer exist and until prescribed fees are paid.

14. It does not follow that a quarantine is imposed whenever one of the named troubles is found in or near a nursery. The present established practice is only to require suitable remedial action if

(*a*) in the case of Woolly Aphis, not over half of one per cent. of the apple stock examined in a block is infested; and
(*b*) in the case of the listed troubles other than Woolly Aphis and Pernicious Scale, not over one-fifth of one per cent. of the stock of any one or all kinds of the plants examined in a block is infested; and
(*c*) in the case of palms and house plants, not over five per cent. of the stock of any one or all kinds of the plants examined in a block or house is infested,

provided that surrounding vegetation appears to be free of the pest. A quarantine is imposed on apple stock if Woolly Aphis occurs within 50 feet of stock or within any further distance up to 200 feet if the infested trees exceed one foot in height for every 15 feet of the horizontal distance that separates them from the stock. A quarantine for Pernicious Scale is imposed if an infestation is found within the distance fixed for Woolly Aphis or is found anywhere on the same property and is not kept rigorously suppressed. A quarantine is imposed for any other of the listed troubles if

(*a*) in the case of orchard and plantation tree stock, infestation occurs within 25 feet or within any further distance up to 100 feet should the infested vegetation exceed one foot in height for every nine feet of horizontal distance;
(*b*) in the case of outdoor ornamental stock, palms and greenhouse stock, infestation occurs within one foot of horizontal distance for every foot in height of the infested vegetation.

A nursery plant is considered infested if a single specimen of a listed pest is found on it, but no account is taken of a pest on surrounding vegetation if the inspector can and does remove all that he can find and deems that none remains. A quarantine is levied on the whole nursery or only on specified part or parts, according to the circumstances of the particular case; in general, it is confined to the block or blocks of stock that at some point come within the quarantine distance from infested plants. The entire stock of small nurseries is closely scrutinized; while, according to the apparent need, up to one-third the stock of each kind in every block is subjected to careful examination in the large nurseries. Sometimes as low as 10 per cent. of deciduous stock is examined, but never less than 20 per cent. of citrus stock. The regulations require the fumigation of all deciduous fruit trees and of citrus trees sent out from nurseries, irrespective of the known presence of pest insects. The fumigation of any other kind of woody plants may be required by the inspector, and is supposed to be required if any notified pest insect is discovered on or near the stock. Many nurserymen customarily fumigate all roses and hardy plants of all other kinds.

15. The number of registered nurseries during the past three years was as follows:—

		1913-14.	1914-15.	1915-16.
Cape	Western half	184	88	89
	Eastern half	69	64	69
Transvaal		112	104	106
Natal		35	29	29
Orange Free State		20	20	20
	Total	420	305	313

The falling off in the number of registrations in the Western districts of the Cape Province, and in Natal, after the 1913-1914 season was due to vine nurseries, from which the distribution of vines is limited to certain viticultural districts, and of nurseries in which carnations only are grown, being exempted from the necessity of registration by Government Notice 546 of 1st April, 1914. The explanation for the exemption was given in my 1913-1914 report. Of the 313 nurseries registered for the past year 43 were very small concerns, principally jobbing gardeners' premises, that carried a stock of less than 2,000 woody and greenhouse plants. I consider it unprofitable to the country from the pest dissemination point of view to trouble about the inspection of such places, and of fully a hundred more of the remaining nurseries, but all have to be treated alike to avoid the grievous offence that would be given were any distinction made amongst sellers, large or small, who offer the same classes of stock. Every nurseryman is obliged to provide and maintain a fumigation chamber, conforming to certain conditions, unless he is exempted from the obligation. No nurseryman who grows fruit trees is granted exemption, and no nurseryman who grows other kinds of woody plants if any of his stock is found infested with one of the notified scale pests. The nurserymen who had fumigation chambers at the last inspection number 166.

16. Each nurseryman is asked to state on the form he fills out, in applying for registration for the year, what area of ground he has under nursery stock, and what quantity of stock of different kinds he expects to have ready for sale during the season. From the information thus obtained for the last two seasons the two following tables were compiled.

	1914-15.	1915-16.
Nurseries with ½ acre or less under stock	65	87
,, ½ to 3 acres ,,	155	167
,, 3 to 10 acres ,,	64	50
,, 10 to 25 acres ,,	18	5
,, 25 to 60 acres ,,	3	4

The aggregate area reported under nursery stock was 776 acres in the 1915-1916 season, against 878 acres in the previous year, but it is doubtful that the area actually decreased. Apparently, in the latter year, the nurserymen as a whole were much more careful in allowing for ground not under cultivation, and the decrease shown is spread over many nurseries. The decrease, moreover, is not reflected in the figures for nursery stock, which are as follow:—

	1914-15.	1915-16.
Deciduous Fruit Trees	1,105,700	1,102,200
Citrus Trees	505,400	572,600
Other Fruit Trees than foregoing	27,700	19,500
Vines	1,283,500	814,500
Forest and Shade Trees	13,025,500	11,737,400
Hedge Plants	1,204,300	1,135,200
Roses	468,100	396,200
Hardy Ornamentals	368,300	275,400
Palms	127,800	95,000
Greenhouse Plants except Palms	158,600	184,400

These figures can be considered as only roughly approximate, but they are probably fairly close in regard to fruit trees. The decrease in vines was due to certain Western Province vine nurseries that were registered in the one season not being registered in the other; and the decrease in hardy ornamentals to a gross over-estimate on the part of one nurseryman in the first of the two years.

17. Of the 305 nurseries registered for the 1914-1915 season, 263 were inspected; and of the 313 registered for the 1915-1916, 261 were inspected. Those omitted from the inspections were almost all Government or private forest tree nurseries in out-of-the-way places, or nurseries which were recorded to have no saleable woody plants. With a few exceptions the forest tree nurseries grow stock entirely from seed, and in clean surroundings, and under these circumstances it is deemed inadvisable to incur the expense and trouble of visiting them every year. All fruit tree nurseries were inspected, and a large number of them were visited twice or more. Two inspections of citrus tree nurseries, in which there is special reason to suspect Red Scale, one before the summer selling season, and the other before the winter selling season, are desirable, but in the past season it was impracticable to arrange for the early summer one owing to the nursery inspectors being urgently needed at the time for locust work.

18. Fifteen nurseries were quarantined in the 1914-1915 season, five in respect to the entire nursery, and ten in respect of part. Seven of these quarantines were because of Red Scale alone, and four more in part because of the species. One was because of Woolly Aphis alone, and one solely and three in part because of Ross Scale. Circular Purple Scale was the partial cause in two cases, Araucaria Mealy Bug in two more, White Peach Scale in one, and Mussel Scale in one. Eleven of the fifteen quarantines were removed before the expiration of the nursery year, and two others lapsed by the abandonment of the premises as nurseries. In the 1915-1916 season twenty-five nurseries were quarantined, ten in respect of the whole premises, and the remaining fifteen in respect of part. Eleven were quarantined for Red Scale alone, one for Ross Scale, one for Woolly Aphis, and two for Citrus Canker. The remaining ten were quarantined because of two or more troubles. Red Scale and Ross Scale each figures in seven of these cases, White Peach Scale and Spanish Red Scale each in five, Circular Purple Scale and Grey Scale each in four, Pernicious Scale in three, Woolly Aphis and Araucaria Scale each in two, and Araucaria Mealy Bug in one. Three nurseries that were quarantined in 1914-1915 were quarantined again in 1915-1916, and two others quarantined in 1914-1915 remained in quarantine throughout the following year.

19. According to the part of the Union in which they are situated the nurseries placed under quarantine restrictions in the two seasons may be classed as follows:—

	1914-15.	1915-16.
Cape (Western half)	3	2
Cape (Eastern half)	5	10
Transvaal	3	11
Natal	4	2

The increase was chiefly due to certain nurserymen having persistently neglected to carry out needful cleaning-up measures that had been repeatedly urged upon them. It is probable that in the coming season there will be a large increase in quarantines applied in the western half of the Cape, because of similar neglect, a number of nurseries there having only narrowly escaped restrictions in the seasons now reviewed. Only a few fruit tree nurseries appear wholly free from the prescribed quarantine insects, but the condition of most of them is fairly satisfactory, considering what it was in years gone by, and considering that certain of the insects, particularly Red Scale, are so common on permanent vegetation in the centres where the chief nurseries are situated. It is a pleasure to record that not a single specimen of any of the prescribed insects was found in what is much the largest fruit tree nursery in the Union; but several other prominent fruit tree nurseries are found more or less seriously infested at every inspection, and, I am being forced to conclude, will have to be dealt with somewhat more harshly in future than in the past, in order satisfactorily to safeguard the public interests. The quarantines for Pernicious Scale will be discussed under a special heading. Those for Citrus Canker were imposed late in the financial year. The disease is a serious one of bacterial nature, now being strenuously combated at great expense in Florida, with a view to its eradication from that State. It was introduced into the Transvaal several years before Union, but until very recently its true nature and seriousness was not recognized in this country. The two nurseries had become infected from a common source. Both lie between Pretoria and Rustenburg in the Transvaal. No citrus trees had yet been propagated at one of them. The other was first registered in July, 1915, and has since distributed possibly infected trees to a number of customers in widely separated parts of South Africa. The Division of Botany is dealing with the subject, and it is probable that the disease will be effectively stamped out at any new place to which it was taken by these young trees. When the disease was found in the nursery there was little of it, apparently, amongst the saleable trees, but it was very prevalent amongst a large number of lemon seedling stocks, the budding of which had almost completely failed because of it. There is no particular reason to suspect its presence in any other nurseries in the country.

20. *Plant Import Regulations.*—No change during the year was made in the rules and regulations governing the introduction of plants and fruits from oversea countries, except that from 1st October, 1915, the introduction of persimmon stocks was prohibited, and that of apple stocks restricted to 2,000 for any one person. Notice was also given that from 1st October, 1916, the introduction of apple stocks would cease. The various restrictions on the introduction of plants otherwise remain as described in my 1912-1913 report. Plants other than bulbs, tubers, and seeds (except cotton seed) are admitted only under special permits; and in the case of woody plants other than certain fruit tree stocks, the number of any one variety for which a permit is given to any one person in a year is limited to ten, while no permits are given for many kinds. Excluding a number that were not utilized, the permits were for introductions of plants as follow:—

Description of Plants.	Number of each Group.		
	1913-1914.	1914-1915.	1915-1916.
Stocks for budding, and			
Northern Spy Apple ..	538,300 (23)	92,010	165,000 (21)
Pear	157,000 (16)	89,000	80,000 (9)
Plum	19,500 (7)	12.000	44.000 (3)
Cherry	20,250 (9)	21.000	17,500 (6)
Almond	1,000 (1)	—	1,000 (1)
Citrus Trees			52 (3) and scions 130 (1)
	421		336 (12)
Other Fruit Trees ..	and scions 379	363	and scions 400 (2)
Nut Trees			644 (7)
Small-Fruit Plants and Strawberry	2,393	998	817 (15) and cuttings 53 (1) 498 (4)
Vines	613	3	40 (4) and cuttings 450 (3)
Roses	2.251	681	1,638 (56)
Ornamental Shrubs & Small Flowering Trees ..	6,459	1,181	3,379 (50)
Other Ornamental Trees ..	245	136	80 (14)
Palms	10,114	2,083	3,627 (16)
Carnations	24,816	19,640	12,873 (38)
Chrysanthemums	4,704	—	3,229 (34)
Other Herbaceous Plants, Ferns, etc.	13,559	14,108	13,579 (109)
Spineless Cactus Joints ..	1,000	11,995	88 (3)
Sugar Cane Cuttings ..	—	254	38 (3)

The figures in brackets record the number of separate importations making up the aggregate number of plants. Other plant importations during the past year comprised 2,567 hop sets and 2,000 asparagus roots. The apple stocks imported into the Union all come from Australia, while most of the introductions of other fruit tree stocks and of plants in general come from European sources. The few citrus trees imported last year came from Florida, and the citrus scions from California, while the few deciduous fruit trees came from various European, American and Australian sources. The falling off of the imports of apple stocks in the 1914-1915 season was due to the abnormal heavy imports in the previous season, owing to apprehension that further introductions would be prohibited.

21. No insects or diseases worthy of particular mention were detected on the plants admitted from oversea during the past year. All the woody plants were fumigated with hydrocyanic acid gas, and the currants, gooseberries, walnut and chestnut trees, and also the vines and stone and pome fruit trees in certain circumstances, were immersed in 2 per cent. copper sulphate solution These precautions are customary. In these treatments, and in the restriction of imports of woody plants to small numbers, lie the chief merits of the plant import regulations for their purpose of safeguarding the Union against pests that may reach the country incidental to the introduction of plants. The

inspection that takes place is ample to guard against the admittance of obviously diseased plants, but not against the admittance of such as are sparsely infested with unfamiliar and inconspicuous troubles. The close inspection of every plant is practicable only in small consignments, and not even the careful inspection of small lots of plants by a highly trained inspector can be fully depended upon; but it is evident that the fewer the plants and the better qualified the inspectors the less is the risk of pests being overlooked. The port inspectors now employed are painstaking enough, but they lack in technical qualifications for their duties; and the work is so intermittent and the plants they examine of such diverse kinds that they cannot be said to acquire much experience of value. All things considered, the inspection of imported plants is not as efficient as the inspection of nursery stock in the country, for the nursery inspectors have the advantage of seeing plants in great numbers under fairly constant conditions, and thus becoming so accustomed to normal appearances that they are quick to detect anything abnormal. Plants that arrive from oversea are almost always more or less soiled as an outcome of the confinement, and are consequently difficult to inspect compared with growing plants. I hold, therefore, that it is a mistake to entrust the port inspection to the type of man now employed for this duty any longer than is unavoidable. At present better qualified men are not available in the country, and the salary scale attached to the posts is inadequate to attract better qualified men if there were any to be had. The maximum of the scale is £250. The Egyptian Government recently advertised for a plant inspector, and offered £375. Were men trained in entomology to hold the posts a great deal of entomological work could be carried on without interfering with the inspection duties; but a large part of the time of some of the present inspectors is spent in idleness through lack of departmental work, of which they are capable, that can be fitted in with the inspection service.

22. The importation of the chief fresh fruits shown by plant inspectors' reports for the past two years were:—

Kind.	Cape Town.	Durban.	Port Elizabeth.	Total.	
				1913-14.	1915-16.
Apples:					
Australian ..	1 case	—	—	23,869 cases	1 case
European & American	1,055 bbls. 8,797 cases	660 bbls. 515 cases	— 1 case	8,840 bbls. —	1,715 bbls. 9,313 cases
Madeira	819 ,,	—	46 cases	18,803 cases	865 ,,
Pears:					
Australian ..	1 case	—	—	1,225 ,,	1 ,,
European & American	465 cases	—	—	2,315 ,,	465 ,,
Madeira	18 ,,	—	—	—	18 ,,
Oranges (European)	658 ,,	4 cases	—	1,784 ,,	662 ,,
Lemons (European)	776 ,,	577 ,,	—	2,120 ,,	1,353 ,,
Grapes (Spanish) ..	324 bbls.	553 bbls.	35 bbls.	2,754 bbls.	912 ,,

The figures for the year immediately preceding the war are given for comparison, as I believe the falling off in the imports of fruit to be chiefly due to the war. The absence of any commercial importations of apples from Australia in 1915-1916 was due to the drought in Australia, however, as well as to the lack of shipping accommodation. Baskets of apples from Madeira are counted as cases, and two half barrels and two half cases as one barrel and one case respectively. The apples from Europe included some small consignments of English and Irish apples, but were nearly all Pacific coast apples reshipped from London. The inspection revealed nothing unusual in respect of insect pests and diseases. Some of the lots of apples from Eastern Canada were considerably spotted with Fusicladium, but only one to such an extent that its admittance was restricted. The fruit in this one case was exposed to formaldehyd gas, as is the custom in respect to potatoes. Codling Moth, Fruit Fly, Oyster Shell Scale and Mealy Bug are recorded from apples, but in no case to an extent that warranted the rejection of the fruit. As in every year, some Red, Mussel, Parlatoria and Oleander Scales were not uncommonly found on citrus fruit; the practice is to fumigate the whole consignment when the average number of scales per fruit exceeds a certain limit.

23. *Potato Import Regulations.*—These have remained unchanged. The Division of Entomology is responsible for applying the Department's requirements concerning potato imports, but not for the recommendations on which these requirements rest. A declaration of the place of origin is required in respect of each consignment, and also an official certificate that the locality named is not within five miles of any outbreak of Warty disease should an official assurance not be on file that the disease named is unknown in the country. A percentage of each consignment is examined, the potatoes being turned out

upon sorting tables for the purpose; and the rules require the rejection of the whole consignment if any Warty disease is found, and examination case by case, and the rejection of any case in which infection is discovered if any pathogenic bacterial disease is present. No rejections occurred during the past year. As a safeguard against common scab and other surface diseases all imported potatoes for several seasons have been fumigated, without removal from the case, with formaldehyd gas, but it has been decided to abandon this practice in future.

24. The imports, according to the plant inspector's returns, were as follow for the past three years:—

Port of Entry.	1913-1914.		1914-1915.		1915-1916.	
	Packages.	Weight.	Packages.	Weight.	Packages.	Weight.
		lbs.		lbs.		lbs.
Cape Town	58,659	4,346,381	10,786	747,486	7.243	504,876
Durban	54,394	4.532,129	10,461	903,352	6,230	584,466
Port Elizabeth ..	27,768	1,997,094	10,550	798,930	10,897	974,184
East London ..	39,930	2,945,361	3,609	249,944	1,509	100,188
Mossel Bay	4,045	269,630	616	43,032	200	13,200
Pretoria	28	2,380	—	—	—	—
Totals ..	184,824	14,092,975	36,022	2,742,744	26,079	2,176,914

The imports normally fluctuate considerably from year to year, but from the information given me by firms in the trade I believe those for the last two years would have been fully as great as those in the previous year had it not been for events connected with the war. Practically the whole of the imports during the two latter years and four-fifths in the earliest year were for planting.

25. The following table, showing the country of origin of the potatoes, is further indicative of the war:—

Country.	1913-1914.	1914-1915.	1915-1916.
Great Britain	3,499,865 lbs.	1,664,016 lbs.	1,742,514 lbs.
France	8,176,874 ,,	1,071,878 ,,	434,400 ,,
Germany	1,749,584 ,,	—	—
Holland	261,116 ,,	1,600 ,,	—
British East Africa	279,176 ,,	—	—
Other Countries	126,310 ,,	5,250 ,,	—

26. Although, under instructions, all potatoes are admitted regardless of condition, so long as Warty disease and pathogenic bacterial trouble is not present, the contents of five per cent. of the cases in every consignment are sorted over, and record made of the proportion of diseased tubers. All tubers showing any trace of decay are classed in one division; all showing any form of scab, but no decay, in a second, all showing Rhizoctonia, but no decay or scab, in a third; and all showing insect tunnelling not wholly visible, but no decay or scab or Rhizoctonia in a final division. The average percentage for the four principal ports placed in each of the four divisions has been as follows for the past three seasons:—

Percentage of tubers affected with.	1913-1914.	1914-1915.	1915-1916.
Fusarium and other decays	2·1	2·6	4·7
Oospora and other scabs	3·3	13·6	6·8
Rhizoctonia	2·6	13·3	15·3
Insect tunnellings	1·9	6·4	6·3
Total percentage ..	——9·9	——35·9	——33·1

These figures leave out of consideration consignments that arrive in bad condition, and are abandoned by the consignees, and they do not include tubers that are merely cut or that have insect injuries wholly in view. It is therefore evident that a high proportion of the imported seed used in the country is blemished by disease. The percentage of defectives varies enormously from consignment to consignment. In some lots practically every tuber is sound and clean; in others, practically every one is blemished. As the figures given show, the average condition is much worse during the two years of the war than in the preceding year.

27. *Regulations relative to Bees.*—No "foul brood" is known to occur in South Africa, and with the object of excluding these and other bee diseases, such as the "Isle of Wight

disease," the importation of honey is prohibited, and the importation of beeswax and foundation comb is allowed only under special permit, and, except in the case of "cera alba," providing it is certified to have been disinfected in a prescribed manner. The introduction of bees is restricted to Government importations. No bees have been imported since Union. The permits granted for wax and foundation comb in the past three years were for amounts as follow:—

Article.	1913-1914.		1914-1915.		1915-1916.	
	Permits.	Weight. lbs.	Permits.	Weight. lbs.	Permits.	Weight. lbs.
Beeswax	77	8,610	44	5,971	21	13,232
Foundation comb . .	25	2,045	22	2,067	16	1,199

No attempt has been made to ascertain the reason for the fluctuations, but it is suspected that more South African made foundation comb is coming into use, and that more wax is imported for the making of floor polish. Rhodesia and Portuguese East Africa likewise prohibit the importation of honey, and severely restrict the introduction of bees.

28. *Codling Moth Regulations.* These regulations are designed to retard the spread of the Codling Moth into certain extensive parts of the Union where it is unknown, and where the chief fruits affected are or might be profitably grown. The sending of apples, pears and quinces, and of boxes that have contained such fruits, into defined areas is prohibited, and railway and postal officials are under instructions to assist in rendering the prohibitions effective.

The attention of the general public is directed to the restrictions by a large poster displayed at railway stations, and by information in the postal guide. The "closed" areas remained unaltered in the two years to 1st April of this year, but an extensive alteration has since been made that has thrown open the last of the closed railway points on the main lines of traffic between the principal Cape ports and Johannesburg and Pretoria. The restrictions may now be said to have outlived their usefulness, but they no longer hamper the sale of fruit to an appreciable extent, and to remove them would probably cause much ill-feeling and misunderstanding. The number of infringements that came to the notice of the Division in the past year was only 14. Half of the cases were dropped, or the offending person merely warned by the police or magistrate against a repetition of the offence, and one case was lost in court owing to a flaw in the evidence. In the remaining six cases the person charged was found guilty. One person appealed against the conviction, but the higher court upheld the magistrate's judgment. In the previous year there were 29 reported infringements and 21 convictions.

29. The Codling Moth continues to spread. Amongst the places determined within the last two years to be infested are Potchefstroom, Boskop, and Heidelberg, in the Transvaal; Parijs, Viljoens Drift, Senekal, and Harrismith, in the Orange Free State; and Upington, Maclear, and Komgha (farm near), in the Cape Province. No place in Natal is yet known to be infested; nor, so far as is known officially, is any place in the Bathurst district of the Cape Province, although Grahamstown, near the border of the district, has had the pest for five years or more.

30. *Plant Removal Regulations.*—These regulations are supplementary to nursery regulations, their primary object being to check the dissemination of pests with plants despatched from place to place by persons who are not registered as nurserymen, and whose premises are consequently not inspected. They forbid the shipment of any package by rail or post unless the inclusion of any plant therein is disclosed; and they require that any package containing a plant be referred to a plant inspector for examination if despatch direct to the addressee is not authorized by certificate or special permit. Detailed information on the restrictions is given in the postal guide and in the railway poster mentioned in the preceding section. Railway and postal servants are now and again further reminded of the restrictions by staff circulars, but it is apprehended that the provisions of the regulations are frequently overlooked other than at the centres where the Division's plant inspectors are stationed. However, a considerable number of sendings are submitted to the inspectors; and there is no doubt that the mere existence of the restrictions tends greatly to discourage private sendings of practically worthless plants, particularly of cuttings of rose and fruit trees of common varieties, that are fruitful in spreading pests from place to place. The spread of pests by this agency, however, is principally from garden to garden, not directly to orchards and plantations, and so it lacks much of the importance attached to spread by nursery stock. The Red Scale was detected by the inspectors more times than all other pests together during the year reviewed, and was found more often on fig cuttings than any other plants. Nine other common species of scale figure in the finds, but none that is not already widely distributed in the Union.

31. *Pernicious Scale.*—Plant removals from Pretoria are allowed only under special permit as a check on the dissemination of this pest, and a large share of the time of a plant inspector is taken up in looking after the work which thus arises. The inspector examines every nursery sending immediately prior to its despatch, and personally supervises the cyanide fumigation of the plants should they be of a kind that there is any reason to suppose might be a food plant of the pest. No trace of the scale was found on any plant about to be despatched; but within the town several new centres of infestation, due to the recent transfer of plants, came to light during the past year. Each year the attention of the local public is drawn to the pest by articles contributed to the newspapers. Although it continues to spread, it is still in only a small proportion of the gardens, and its ravages attract little notice. It is observed to thrive somewhat relative to the growth-vigour of the plant, making little progress on trees that send out little or no new growth, because of adverse conditions, but multiplying prodigiously on trees of the same kinds that do not lack for care and water. Trees in well kept gardens and orchards are much more prone to suffer severely if they are not sprayed than are trees in wholly neglected gardens. No occurrence of the scale anywhere in the Cape Province is yet known, and an inspection in the past year failed to reveal any recrudescence of trouble at Maritzburg, Natal, where the only known outbreaks were suppressed four years ago by cutting out and burning measures. A recent inspection at Johannesburg, however, disclosed that the infestation of several Parktown gardens still continues, despite thorough spraying in 1912, 1913, and 1914, which was thought to have resulted in complete eradication; no live scale was discovered at inspections in 1914 and 1915.

32. *Sugar Cane Quarantine.*—New arrangements with respect to suger cane introductions deserve mention in connection with other administrative subjects. The sugar-growing industry of the Union at present depends almost entirely on a single variety of cane, the Yuba. Should this variety fail to continue to be satisfactory through physical deterioration, or any other cause, the sugar industry might be very seriously discommoded. The introduction and thorough testing of varieties that offer promise of being as profitable as the Yuba, so as to be prepared to replace the latter should it fail, is therefore highly desirable, as is also the testing of varieties with the view of finding one better suited to the country's conditions than the present mainstay. These facts have long been recognized by both cane growers and the Department, but the fear that new diseases might be incidentally introduced deterred the Department from permitting any importations of canes in the absence of adequate provision for quarantining them for a period. It is felt that there is risk to the industry in admitting canes even in small numbers to a quarantine station; but the introduction of canes is indispensable to securing varieties new to the country, the development of improved sorts by the growth and selection of seedlings being much beyond practical attainment as matters stand. Shortly before the war the Division took up the subject with the Natal Sugar Association, which represents a large proportion of the growers, and formulated conditions under which introductions should be allowed. Under the arrangement not over 100 cuttings of any variety are to be introduced, and all cuttings admitted are to be entrusted to the Association for growing in quarantine. A quarantine ground has been established on Durban Municipal land, entirely at the Association's expense, and in charge of a committee of the Association. Departmental officers may inspect the place at any time, and no removal of canes from it is made without departmental approval. It is agreed that the Department shall endeavour to procure, at the Association's expense, cuttings of whatever varieties the Association decides it is desirable to have tested; and that only varieties approved by the Association shall be introduced. The Association was expected to find out from its members, and by correspondence with oversea growers, what varieties were desirable; but owing to the disturbed conditions that have prevailed ever since the plans were decided upon, it has not yet taken systematized action in this respect, and the quarantine facilities are being utilized only for a few varieties procured with little or no assistance from the Department. In 1914-1915, 254 cuttings in four varieties, and in 1915-1916, 38 cuttings in three varieties, were admitted. Conditions of entry are that the cuttings be critically examined both by an entomologist and by a mycologist of the Department, and that they be subjected to precautionary disinfection in a fungicide as well as to fumigation with hydrocyanic acid gas.

33. *Locusts.*—Migratory locusts were more numerous in the country in 1915-1916 than in any previous year since 1909-1910, and the application of the compulsory locust-destruction provisions of the Agricultural Pests Act of 1911 gave the Division an enormous amount of extra work. The law requires that occupiers of land report egg-laying and the appearance of hoppers, and that they destroy the hoppers. It is obligatory on the Government to provide some means for the destruction. Throughout the entire year locust matters constituted the chief work of the Pretoria office of the Division, and greatly interfered with regular routine duties, and with a progress of work along more strictly entomological lines. Moreover, practically the whole time of the entomologist (Mr. J. C. Faure), detailed for insect investigations in the Orange Free State, had to be given to administrative phases of locust suppression; and the fact that he proved admirably fitted for this emergency work is no compensation for the possibly permanent harm done in separat-

ing him for a lengthy period from the special nature of work for which he was educated. But, although unfortunate, it seems unavoidable that technical officers of the Division be switched from investigational to administrative duties when senior officers become needed to aid in securing locust suppression.

34. Locust trouble comes in cycles of indefinite duration alternated with periods when for years together the pest, if not wholly absent, at least fails to attract public attention. In my 1914-1915 report (unpublished), I expressed the opinion that a new cycle of locust years had begun. During 1913-1914, as recorded in the report for that year, an outbreak occurred in and about the eastern half of Middelburg district of the Cape Province, and this, it is now evident, was the beginning of the cycle. Early in 1915, apparently quite independently of the trouble in the Middelburg district nine to fifteen months previously, small swarms and numerous solitary locusts were observed in the south-western quarter of the Orange Free State, and it was from this source that the rather severe outbreak of the past year developed. The only species concerned is the ordinary Brown Locust (*Locusta pardalina*). It used to be thought that trouble with the Brown Locust in occupied parts of the Union began with a migration of the pest from the Kalahari Desert or beyond, but neither preceding the 1913-1914 Cape outbreak, nor the outbreak of the past season was there any evidence of such a migration. Instead, the appearance of the pest in both instances was correlated with the break-up of a protracted drought, and is thought to be satisfactorily explainable only on the assumption that isolated locusts or unobserved clusters had been continuously present generation after generation, and had suddenly been able to multiply amazingly. It is considered that vital eggs may accumulate in the soil during a succession of dry years, and that a protracted drought tremendously favours the locust by relieving it of natural enemies that are relatively slow, compared to the locust itself, to respond to the opportunities for increase afforded by a good season following very dry ones. In a good season, and in the absence of natural enemies, the locust is capable of multiplying a thousandfold. The region where the trouble began in 1915 was invaded by swarms of locusts from the Kalahari in March and April, 1909. Eggs were laid, and in the following spring the resultant hoppers were combated energetically. The few winged swarms that developed were greatly harassed by birds, and were thought to have been eradicated utterly before egg-laying could have occurred. From April, 1909, until November, 1914, drought conditions prevailed in the south-western part of the Orange Free State, the precipitation registered at Fauresmith averaging only ·76 inch per month for the whole period, and only ·63 per month for the last 28 months. Throughout this period no locusts are known to have been observed. With November, 1914, came splendid rains, and the region, which for successive years had been bare and parched, quickly became covered with a most luxuriant growth of grass. Plant feeding insects, including grasshoppers, soon became extraordinarily abundant, and towards February it was discovered that true locusts were present. Many had green markings, a feature that appears highly unusual, at least in respect of the Brown Locust, as it has been known hitherto. Pumps and poison were at once distributed by the Division, and efforts made to combat the hoppers of the second generation. The work was largely unavailing, however, owing to the general absence of swarm formation, and the difficulty of locating the pest in the tall grass. Enquiries and investigation later in the season disclosed that isolated winged locusts had come to occur over an enormous area, and that very few farmers were aware of their presence. Many swarms, for the most part small and lacking in density, also hovered about. This was the position at the beginning of the 1915 winter.

35. A variety of initial measures were taken to acquaint the public with the threatening danger, and with the obligations, under the locust law, of farmers and other occupiers of land. An official notice was published in the leading newspapers. A copy of this was sent to each of the local newspapers, about fifty in number, circulating in the area together with a letter to the editor requesting him to impress upon his readers the necessity for them to give heed to the subject. Circulars to the same effect were sent to several hundred influential farmers and persons prominent in farming affairs; and, lastly, a printed notice was distributed to the magistrates with the request to each that one copy be displayed on his official notice board and others posted where they would attract wide attention, as: in post offices, at field cornets' offices, in general stores, etc., throughout the district.

36. The writer was away from the country when the outbreak of the new season took place and the direction of affairs then rested upon the Assistant Chief of the Division, Mr. Claude Fuller. He made Mr. F. Thomsen, of the Pretoria headquarters and who was chief locust officer in the Transvaal before Union, Senior Locust Officer for the infected districts south of the Orange River; and Mr. Gideon J. Joubert, Department of Agriculture, Representative in Orange Free State, Senior Locust Officer for the districts north of the river. The Division's entomologist for the Orange Free State, Mr. J. C. Faure, was deputed to assist Mr. Joubert. These senior locust officers were charged with arranging for depôts from which farmers could secure supplies of poison and pumps; with instructing local locust officers in their duties; and with making arrangements to overcome local difficulties as they arose. For part of the season, an experienced clerk of the Division was temporarily transferred from Pretoria to Bloemfontein to assist Mr. Joubert. Active

assistance was secured from the magistrates and police. The magistrates were depended upon to engage most of the local locust officers, and in general the senior locust officers worked through the magistrates, and the magistrates acted under their advice and in consultation with the Division headquarters. Some of the magistrates were particularly helpful: notably Mr. St. J. Cole Bowen, of Fauresmith District, and Mr. A. J. R. Wilmot, of De Aar District and the assistance of everyone was practically indispensable. The police assisted principally in the distribution of supplies; but when no locust officer was locally available the police frequently rendered excellent services in stimulating farmers to action, and in demonstrating how poison should be used. The hoppers appeared in far greater quantities in a number of districts than had been anticipated and the task of securing their destruction was fraught with difficulties that gave Mr. Fuller and his assistants a most worrisome time, and were only overcome by dint of masterful action over a period of many weeks. By far the worst infected districts were Bloemfontein and Fauresmith and the work was at its height during the heat of an election campaign amongst an electorate disposed to be decidedly antagonistic to the Government. The area was almost wholly pastoral country in which locust destruction is least obviously of direct value to the occupiers, and it was six to eight years since the pest had last given trouble. The farmers were therefore inclined to be apathetic in respect to their obligations to destroy the hoppers and the problem of inducing them to comply effectively was a peculiarly delicate one that required the exercise of consummate patience and tact. It should be mentioned that great credit is due to Mr. F. van der Merwe of Fauresmith, who acted as assistant senior locust officer over several districts, for the leading part he took in this work. Efficient locust destruction in this country, even under the most favourable circumstances, depends far more on winning the goodwill of the farmer and on his becoming convinced that the measures required are in his own interest than it does on the fact that delinquents are liable to prosecution. The present legislation is hopelessly weak in the absence of local support and is really chiefly useful as a declaration that it is the occupier's moral duty to destroy the hoppers that appear on his land; but it is doubtful if the law could be made much more effective without introducing decidedly obnoxious provisions.

37. The hatching began in the middle of September and was exceedingly irregular, a succession of hatchings occurring in many localities over nearly two months owing to the rains not reaching all the eggs at once. The protracted hatching period naturally augmented the difficulties of both the farmers and the supervising officers. The area infested proved smaller than was expected from the observations on the winged locusts, but on the other hand, the outbreak was vastly more intense in a number of districts than had been anticipated. The outbreak was almost entirely encompassed in an extent of about 20,000 square miles, roughly bounded by a line joining Kimberley, Bloemfontein, Colesberg, De Aar and Prieska. It is almost impracticable to size up locust visitations in a way by which their severity and what is accomplished in suppression work in different years can be compared, and even in a way by which operations in one locality can be compared, other than roughly, with those in another locality in the same season. The following table, however, gives at least a general idea of the operations against the first generation of the pest in the past season:

LOCUST DESTRUCTION, SEPTEMBER-DECEMBER, 1915.

District.	Local Officers employed.	Days worked by L.O.'s.	Farms Infested.	Swarms Destroyed.
Northern Area:				
Bloemfontein	15	570	385	6,041
Fauresmith	18	872	386	5,294
Jacobsdal	5	268	114	1,101
Edenburg	4	116	107	1,051
Boshof	3	182	129	1,520
Philippolis	2	97	35	438
Herbert	1	49	32	253
Kimberley	1	30	—	—
Swarms not included in above ..	—	—	—	1,567
Southern Area:—				
Philipstown	8	239	118	1,164
Prieska	4	117	84	657
Britstown	4	48	89	209
Hopetown	5	189	176	963
Colesberg	1	49	15	283
De Aar	1	56	29	313
Totals	72	2,882	1,699	20,854

Most of the locust officers employed worked continuously from the time of their engagement to the cessation of operations with the flight of the locusts, but some worked intermittently, combining supervision of an area with continued attention to their private affairs. Many of the officers were field cornets, justices of the peace, or men otherwise prominent and influential in their respective localities. The value of the services of such men is naturally out of proportion to what is paid to them as locust officers. It was impracticable to determine what number of farms was infested and how many swarms were destroyed by a study of the officers' regular weekly reports, but special resumé reports giving such data were requested at the close of the work and it was chiefly from these that the foregoing table was compiled. The officers in the northern area were asked to classify the swarms they reported upon as small, medium, or large according to the area each would occupy when at rest, one being called "small" if the area was less than 25 square yards, "medium" if between 25 and 100 square yards, and "large" if upwards of 1,000 square yards. Of the total of 15,698 swarms classified, 3,221 were designated as small, 4,551 as medium, and 7,926 as large.

38. The locusts of the first generation that escaped destruction began to reach the winged state during the first week of December and probably all were on the wing by the 24th, on which date the last known swarms of hoppers were dealt with. The number of winged swarms that succeeded the hoppers seemed small, the reports received indicating less than 75, but small lots and isolated individuals were found to be scattered over the area where the hoppers had occurred and over the greater part of Griqualand West. Egg-laying by the new generation began to come under observation in early January, and before the end of the month new hatchings were being reported. Then throughout the remainder of the summer, until April was far advanced, swarms of hoppers appeared sporadically over a large part of the area infested in October-December, and over a vast extent of country to the north-west, west and south-west. These new locusts were, in part, progeny of the earlier ones, but in part from eggs that had certainly been in the ground for six months or longer. The swarms were much less numerous than in the earlier outbreak and few of them were of really large dimensions, but they were spread over such an immense area and appeared so irregularly that their suppression entailed a relatively heavy expenditure. The same circumstances render it possible that many swarms never came to official notice. The whole region involved is thinly settled, semi-arid, pastoral country in the best of which a farm is small if not over 3,000 acres. In large parts the average farm is upwards of 10,000 acres in extent and some are more than five times as large. Permanently or temporarily unoccupied farms abound, and over great stretches of the country swarms of hoppers easily escape detection from a short distance owing to the character of the surface. Methodical farm to farm inspection for locusts over a great area is utterly impracticable in the absence of a general outbreak owing to the enormous expense involved, and in our work of the past season inspection was confined to localities where the pest was known or strongly suspected to occur. Persons well acquainted with a district usually know where in it locusts are most likely to be found. The following table serves to show the distribution of the pest as well as to give a general idea of the work accomplished. It is compiled on the same lines as the table given above for October-December, and in considering the figures given it should be borne in mind that swarms vary enormously in size and density, and that what one locust officer might report as a single swarm another might report as several swarms owing to its being somewhat split up at the time:

Locust Destruction, January—May, 1916.

District.	Officers.	Days worked.	Farms infested.	Farms visited.	Swarms destroyed. Small.	Medium.	Large.	Total.
Orange Free State :	No.	No.	No.	No.	No.	No.	No.	No.
Bloemfontein	4	38	73	20	83	82	44	209
Fauresmith	3	74	235	29	11	32	11	54
Jacobsdal	2	33	80	50	40	71	371	482
Kroonstad	1	10	22	3	8	4	1	13
Boshof	6	221	471	269	940	614	889	2,443
Philippolis	1	4	10	1	0	3	0	3
Griqualand West :								
Herbert	5	104	102	54	66	112	63	241
Kimberley	3	54	133	72	71	178	224	473
Barkly West ..	4	138	138	69	145	118	148	411
Hay	4	217	150	81	285	100	19	404
Bechuanaland :								
Kuruman	1	71	56	32	6	8	404	418
Gordonia	1	7	desert		1	(birds)	0	1
Taungs	6	150	60	41	104	128	90	322
			and	reserve				
Vryburg	7	282	232	112	158	270	14	442
Cape Province (other) :								
Steynsburg	1	75	22	16	23	19	25	67
Philipstown ..	2	39	84	4	9	4	0	13
De Aar	1	16	45	38	146	133	2	381
Britstown	4	11	103	90	—	—	—	212
Hopetown	3	61	129	14	16	17	9	42
Prieska	1	4	21	2	4	0	0	4
Victoria West ..	2	46	46	25	13	306	69	388
Beaufort West ..	1	2	0	1	0	0	0	1
Hanover	2	5	16	10	0	0	0	0
Namaqualand ..	1	13	large	reserve	1	0	2	3
Transvaal :								
Lichtenburg ..	1	50	100	0	0	0	0	0
Bloemhof	1	14	67	0	0	0	0	0
Potchefstroom ..	0	0	35	2	0	1	0	1
Totals ..	68	1,738	2,430	1,035	2,130	2,200	2,385	7,028

Although the figures do not evidence it clearly the outbreak was most severe in the north-western corner of the Orange Free State, in the eastern part of Bechuanaland, and north-eastern part of Griqualand West—that is over a considerable area comprising the adjoining parts of Orange Free State, Griqualand West and Bechuanaland, and in the Victoria West district far to the south. The outbreak was of small importance east of the western railway (Cape Town—Kimberley line) south of the Modder River which was the portion of the infested area where the trouble was much the greatest in the October-December operations. In this part the hatching period was relatively short and migratory locust birds, both large and small, were so numerous that it is probable that few hoppers would have matured even if there had been no poisoning. As events were the birds alone destroyed many swarms and completed the destruction of all the others, aided somewhat, but apparently not greatly, by locust flies. Elsewhere in the area the birds also rendered valuable assistance, but in most localities were too few to cope effectively even with the early appearing swarms; a condition perhaps to be accounted for by the relative scarcity of surface water where they might drink. The main hatchings in these parts, however, came in March and April and by then the birds were leaving or had left for their nesting regions in northern Africa and Europe. The few swarms dealt with in Namaqualand had no known connection with the main outbreak. They were located by the police on the Steinkopf native reserve (about 1,000,000 acres) about 70 miles from Springbok and it was thought advisable to get them destroyed lest they give rise to greater swarms. The magistrate had to send the officer and labourers together with pumps, poison, water casks, etc., to the place by wagon, and the equipage was in the field following and destroying locusts for a week, the remaining six days being spent on the long journey. The expedition cost the Government upwards of £50 but the expenditure was deemed to be justified by the results. It is understood that two of the swarms destroyed were very large. Not all the voetgangers were destroyed, however, the police finding some through the mountains where it was practically impossible to carry on operations owing to the scarcity of water. The one swarm listed for Gordonia came to notice through a sheep inspector. It was seen in the desert near Scheurberg, 72 miles east from Upington, back of the Langebergen, and an officer with equipment was sent to investigate the case largely as a precaution against the Division being taken by surprise by winged swarms from the desert. The officer learned of one small swarm only and this had been found and eradicated by the large locust bird before the officer arrived at the place. With the exception of six miles, the journey was through heavy sand the whole way. This expedition cost only the officer's wage of 13s. 4d. per day. The work in the Kuruman district was largely on unoccupied farms and under the personal supervision of the locust officer. The costs have been recovered from the absent owners of the properties, as was also the cost, aggregating about £150, of destroying the pest on a number of unoccupied farms in the Boshof district.

39. The destruction measures employed were those developed in former work against voetgangers in South Africa; that is, dependence was placed almost entirely on arsenically poisoned syrup used either to spray the vegetation or in the preparation of a bait to spread amongst the insects. The syrup was issued free of charge from magistracies and police posts, and, to some extent, public-spirited farmers and storekeepers being readily found who for the convenience of surrounding farmers were agreeable to attending to the storage and issue of supplies without charging for the service. Only in exceptional cases had farmers to send over 15 miles for supplies. The poison was issued chiefly in 1½ gallon drums. It is made to contain to each gallon approximately 3⅓ lbs. of arsenite of soda 80 per cent. As_2O_3 strength) and either ⅔ gallon of crude treacle or 6⅔ lbs. of cheap sugar. As it weighs about 14½ lbs. to the gallon it requires a stout container. Directions for its employment are given at length in a special leaflet and it is therefore deemed necessary to refer to this phase of the subject only very briefly here. The greatest strength recommended is one part of the poison as supplied, to fifty parts of water, whether the dilution is to be used for spraying or in preparing a bait. In country of the character of that infested in the past year, baiting is generally preferable to spraying, largely because it requires the use of only a small fraction of the volume of water to kill a swarm, and the favourite basis for bait was dry horse dung collected in the veld. The use of bait further economises poison and does not necessarily require a spray pump. At the beginning of the season the Division had somewhat over 3,000 gallons of poison on hand. The preparation of more was postponed until the early need for an additional supply became certain as there was a suspicion, since largely removed, that the prepared poison deteriorated seriously in attractiveness with keeping. When a need for more was evident, no commercial firm could be found to undertake its preparation, at least at short notice, and Mr. Fuller had, perforce, to have the work done by Division officers. The astonishing and unexpected abundance of voetgangers in Fauresmith and Bloemfontein where good rains had fallen, gave rise to a fear that the outbreak would be very severe over a far greater area when the drought there fully broke up. This fear did not materialize but it led to the hurried preparation of new lots of poison aggregating 21,000 gallons and to a cabled order to London for ninety tons of arsenite. The prepared poison actually issued to farmers during the entire season totalled to about 10,000 gallons and it is conjectured that a considerable quantity of this has not yet been used. Half gallon tins with two inch lever lids, packed six or nine to a wooden case, part made in East London and part in Johannesburg, were used for 5,000 gallons, but these containers have proved unsatisfactory. The remaining 16,000 gallons were put in 1½ gallon drums of the design used in the Cape campaign of 1909 (see 4th Report of Locust Bureau, p. 20) and made by the same maker ; but owing to there being no lead coated steel procurable in the country, nor, owing to the war, procurable within a reasonable time from oversea, these drums were made of galvanized iron and they have proved unsatisfactory, many proving to be leaky after a short journey although perfectly tight when sent away. Galvanized iron for drum-making will be avoided in future, and it is now considered inadvisable for the drums to have lever-lids or handles attached to the side. Unfortunately no maker in the country is yet in a position to turn out a really satisfactory drum at a reasonable price, even if suitable metal is specially imported, while the cost of importing ready-made drums (empty) is almost prohibitive of their use for locust poison. As a precaution against a shortage of spray pumps, 2,000 were imported to augment the supply before the past season opened, but it was found unnecessary to draw on them. Altogether 3,556 pumps, or almost the whole of the old supply in condition for use, were sent to sub-depots and most of these were loaned once or more to farmers during the season. The new pumps like most of the old one, are "Success" bucket pumps fitted with six, feet of hose in place of the customary three. The loan of pumps bristles with irritating features, much time and trouble having to be expended in getting them back and many being returned broken or incomplete. It is proposed in future to require a money deposit of the value of the pump and to retain the deposit if the pump is not brought back within a specified time and in an acceptable condition.

40. The use of arsenic for destroying locusts involves only such risk of poisoning stock as may be guarded against by following the simple directions given on the labels of the containers in which the prepared locust poison is issued, and by the exercise of common sense precautions; but as has happened in every big locust destruction campaign waged with poison, a number of stock poisoning cases unfortunately occurred during the past season. The losses alleged to have been due to the poison that have come to official notice are as follows:

District.	No. of Cases.	Stock alleged Lost.
Bloemfontein	13	44 cattle; 1 horse; 7 sheep.
Fauresmith	3	6 cattle.
Edenburg	1	3 cattle.
Colesberg	2	6 goats; 1 sheep.
Hopetown	1	4 cattle.
Philipstown	1	14 sheep.
De Aar	1	2 horses.
Prieska	1	1 horse.
Kuruman	1	6 goats; 3 sheep.

A number of persons asked for compensation but the Department has not paid in any case, having no reason to accept responsibility. Seven of the Bloemfontein district cases occurred on Bloemfontein town lands and the Bloemfontein Town Council paid amounts aggregating £45 10s. in respect of three of them as an "act of grace" without admitting any liability. In one other of the seven cases the sufferer sought satisfaction in court but the magistrate gave judgment in favour of the Council with costs. The senior locust officer for the Orange Free State respecting all cases in his area reports that negligence and disregard of common sense precautions could doubtless be proved. He states that much of the trouble in Bloemfontein district was due to spraying tall grass and then not keeping stock away from it. There was a very common tendency to use the poison at excessive strength and in excessive quantity, a tendency which has its explanation largely in the fact that the Government supplies the preparation without charge. Baiting is not attended with as much chance for an accident as spraying, but bait in large lumps or that is left in heaps is highly dangerous. The horse lost in the Prieska district was the property of a stranger who came to a farm late at night and was told to put his horses in the stable. Instead he tethered them in an enclosure where there chanced to be a heap of bait ready sprayed. One of the horses got loose in the night, fed on bait, and was found dead in the morning. The incidental danger of having the poison about is illustrated by the Colesberg cases. A drum dropped in off-loading a cart burst open and some of the poison flowed out and was found a little later by a herd of goats, six of which died. In the other case a valuable lamb was put in a room where drums were stored and it licked up poison that had been spilled.

41. For reasons implied in a previous paragraph there were few prosecutions in connection with the locust work, only ten cases in all being reported to the Division, two in Bloemfontein District, three in Fauresmith, and five in Edenburg. Two charges of failure to report were brought but both were lost through inability to prove actual knowledge of the locusts by the accused. It is unfortunate, in this connection, that the Act does not admit of conviction when it is reasonably certain that a person charged with failure to report had knowledge of the insects. The other eight charges were for failure te destroy voetgangers. One was against a municipal council which was found guilty but let off with a reprimand. In one case only was a substantial fine imposed.

42. The ordinary locust officers were paid for their services at the rate of 13s. 4d. per day or £20 per month. No allowance was made to them for subsistence and they were required to furnish their own transport. One employed at this rate used a motor bicycle, the others horse transport. A number who used motor-car transport were paid 10s. per day plus 8d. per mile for distances certified by their magistrates to have been necessarily travelled. As already mentioned the remuneration given can only be considered as nominal in many cases, as the recipients were fairly well-to-do farmers and men with considerable local influence who accepted the work in part from a sense of duty. The one assistant senior locust officer employed in the Orange Free State was paid £1 per day. The several senior officers were men on the permanent establishment of the department. It would be difficult to arrive at a close estimate of the entire cost of the work. The expenditure charged against special appropriations for locust destruction totalled to about £12,000, but this expenditure includes items for much material still on hand and does not include the salaries and expenses of permanent officers nor any allowance for postal and telegraphic services, printing, stationary, etc. Inclusive of the value of materials used and with allowance for the salaries and expenses of the officers who gave practically their whole time to the work, the cost was about £10,000. It is worthy of mention that distribution charges, largely railway carriage, constituted one of the heaviest items of expenditure, about £1,500. Motor-car transport for the senior locust officers

was also a heavy item but is one that should be mentioned as having been a highly important element of the campaign. Without it an equal degree of efficiency could only have been obtained by fully double as many senior officers. The cost of the destruction work to farmers was in the aggregate, no doubt, fully as great as it was to the Government but, except for loss of stock, was chiefly in the nature of labour by themselves and their servants and in their transport of materials.

43. No attempt has been made to collect data on the damage to crops and to veld done by the pest; but, generally speaking, little damage that mattered is known to have anywhere been done either by hoppers before they were killed or by the winged insects that resulted from the escaped hoppers. What damage was prevented cannot be stated in figures. It can only be very roughly conjectured from the experiences of past years when neglect of locust destruction was general. Abundant as the pest was in 1915-1916, it is probable that it was not a tenth as abundant as it would have been without the operations of the previous season; and I seriously believe from a close study of the subject that but for the 1915-1916 work, the pest would have spread north into Bechuanaland Protectorate and Rhodesia; west across the Kalahari into the south-western Protectorate; and south to the sea-board of East London and Peddie, and that in the 1916-1917 season South Africa would have by far the most serious locust trouble in its history. The pest might be no more abundant than it was in 1892-1893 but the greater extent to which crops are now cultivated would render a widespread visitation relatively more important. Absolutely thorough work in locust destruction by artificial measures is out of the question even in the best districts. In such country as was infested last year a proportion of the swarms are practically certain to escape detection and there is almost bound to be numerous survivors from swarms which the average farmer deals with by poison. After the insects had reached the flying stage the locust officers who dealt with the second generation were asked to state the number of swarms they believed to have escaped in their respective areas, and the swarms reported total only to one hundred and sixteen. As was to be expected, relatively more swarms escaped in Griqualand West than in other parts. There is now no doubt that we are in a cycle of years when the locust naturally tends to multiply prodigiously, and it is yet too early to state with any degree of certainty that it is practicable to prevent a great wave of the pest from sweeping over the country; but it seems reasonable to suppose that the work already accomplished has greately reduced the potential volume of the threatening wave. The locust can multiply a thousandfold in a year. It is conjectured that it is largely an increase in bird and insect enemies that in time causes the temporary disappearance of the pest; and it is presumed that while the development of the wave is being retarded by destruction measures, the birds and other enemies are increasing. The conditions that are favourable to the increase of the pest doubtless operate in the extensive tracts of desert country where destruction measures are utterly impracticable and vast swarms may perhaps develop there in the present "cycle" and sweep far down into the Union; but it seems not unlikely that the infestation of the desert is largely dependent on swarms that migrate there from settled parts of South Africa and that in combating the pest in the settled parts the danger of invasions from the desert is greatly minimized. The outlay of £20,000 for locust destruction jointly by the Government and the farmers may reasonably be regarded as an amount necessarily expended in safeguarding vital interests that it was essential should have the protection even were the cost many times as great.

44. The foregoing paragraphs all refer to the Brown Locust (*Locusta pardalina*). South Africa is subject to devastating visitations by another migratory locust, the Red Locust, (*Cyrtacanthacris septemfasciata*), but this species has not given trouble anywhere in the Union for a number of years. In 1893, a few years after the Brown Locust had appeared in inland parts of the country, it began to ravage Natal and in the summer of 1895-1896 it spread suddenly over practically the whole of the eastern half of what is now the Union and subsequently for ten to fifteen years gave trouble along the eastern seaboard as far south as East London. Twice before in the last century incursions of the Red Locust followed close on incursions of the Brown, the one chiefly devastating the coastal belt and the other the interior; and it is rather expected that the Red will soon again give trouble. At the same time there seems a chance that the domination of the Brown species may have effect of checking the excessive multiplication of the Red through the agency of migratory locust birds. The two locusts doubtless respond to the same set of favouring conditions and the Brown leads by reason of its being able to have two generations in one year while the Red has only one. It is suspected that the Red is present in the Union to a very limited extent. A number of scattered flyers were observed on several farms near van Reenen's Pass, Natal, by dipping inspector Bartholomew early in the year reviewed; an examination of captured specimens at this office admitting of no doubt on the identification, and in May a single specimen was sent in by a correspondent who had knocked it down in the heart of Johannesburg. Reports were also received that some small swarms were present in the low veld of the Barberton district but the Division, in this case, was unable to get any authoritative confirmation by specimens. The magistrates in the area chiefly subject to the insect were specially circularised on the subject, but despite this and other measures no more reports have been received,

45. As successor to the "South African Central Locust Bureau" the Division still keeps in direct communication respecting locust matters with the governments of Basutoland, Bechuanaland Protectorate, Swaziland, Southern Rhodesia, Northern Rhodesia, Portuguese East Africa, Chartered Company of Mozambique, and Nyasaland. A few flyers of the Brown Locust were reported in April, 1915 from Ramaqnabane River near the Bechuanaland Protectorate—Rhodesia boundary, but otherwise all reports received from the countries named noted an apparent absence of migratory locusts.

46. *Studies and Investigations.*—Field and laboratory studies are a prime function of the Division and take up the whole time of several technical officers and a large part of the time of several more; but only brief mention will be made in the annual report of this phase of the year's work for the Division as the chief results of investigations find expression in special publications; whereas the annual report is depended upon to furnish the permanent record for administrative subjects such as nursery inspection and locust destruction. A few notes, however, will be given respecting certain insects that are or have been of outstanding interest in the country and which therefore seem worthy of particular notice.

47. Because the vine phylloxera is one of those insects very likely to give rise to a "scare" and a demand for eradication measures when it is discovered in new territory, an effort has been made to learn something of its distribution in the Transvaal by examining suspicious looking vines when opportunity to do so presented itself. As the outcome of observations in the past two years, I am now able to record that it certainly occurs in a number of widely separated places, and that I am convinced its extermination from the province would not be worth attempting even were vine culture a thousand times more important than it is. It was found in a commercial vineyard about eighteen miles east of Rustenburg; in one about 20 miles west of Krugersdorp; and in another about 12 miles north of Johannesburg. Names are withheld in the absence of there having been any general inspection to show whether or not the pest is in the vineyards of rival proprietors. I have also found it in the vineyards at the Potchefstroom School of Agriculture; at Government House, Pretoria; and know it to occur on four other properties in or near Pretoria at one of which I have known it for five years. At every one of the infested places, Cape grafted vines were observed and it is safe to assume that the insect came with them. Most of the introductions undoubtedly took place six or more years ago.

48. The Eucalyptus borer is also mentioned because it is an introduced insect that has considerably agitated the public in some parts of the Union and is likely at any time to leap into prominence in other parts. Until recently the insect was mistakenly known to the Division as *Phoracantha recurva.* Its proper name is *P. semipunctata.* It is a borer that attacks Eucalyptus trees between the bark and the sapwood, which by some accident became introduced into this country from Australia ten years or more ago. Healthy trees are not injured by it but it quickly attacks any that have been felled and left lying with the bark on and easily makes headway in some trees that are much out of health. Quite commonly so many of the insects attack a sickly tree that in a few months all of the connecting tissue between the bark and the wood is eaten away for many feet together and the tree thus killed. Were it not for the attack many trees might recover with a return of conditions favourable for growth. During the recent years of drought, great numbers of Eucalyptus trees, especially about Bloemfontein and Kimberley, succumbed to the insect, or at least were hastened to their death by it, and the losses gave rise to sharp criticism against the Department for not trying to stamp out the pest or at least to take adequate steps to check its spread. The questions involved had long before been considered by the Government officers chiefly concerned and the conclusion reached that national legislative measures for the control of the insect were not warranted. Several articles to post the public on the best methods of dealing with the trouble were contributed to the daily press and to farming periodicals during the past two years. Very soon after having first come to notice, the insect was found to occur here and there over a great area, but there are probably many towns to which it has not yet found its way. During the past year it was recorded for the first time at Klerksdorp, Poetchefstroom, Vereeniging, and Pietermaritzburg. In the previous year it was discovered in a number of localities in and about Johannesburg. It has not yet been noted near Pretoria. The Cape Entomologist has found that its eggs are subject to parasitism in Cape south-western districts. In Australia it is known to have a number of larval parasites and it has been planned for several years to attempt their introduction to South Africa. The Departments of Agriculture of New South Wales and Victoria have promised assistance but, owing to the war, no active steps are now being taken to further the project.

49. Special allusion to the Indian cochineal insect (*Coccus indicus*) is justified by the astonishing rapidity with which it is eradicating the Monacantha prickly pear, especially in Natal. The insect is a close relative to the true cochineal insect (*C. cacti*) and a still closer one to the Cape cochineal (*C. capensis*) that has infested the Monacantha prickly pear in South Africa for nearly a hundred years, but while these relatives have no particularly injurious effect on the plants they infest, the Indian species is positive death in a short time to the kind of prickly pear named and this is the only kind on which it appears able to subsist. The position is extraordinary since both the insect and the

plant originally came from South America where it is presumed they must exist together. What is now occurring in South Africa occurred in India on a much grander scale far back in the last century. A small colony of the insect was brought to South Africa and given to the Division by the Queensland Prickly Pear Commissioners in April, 1913, and from it the insects that are now annihilating the Monacantha prickly pear in various parts of the Union are all descended. Some material was given to Dr. E. Warren of the Natal Museum, Pietermaritzburg, in June, 1913, and in the following September the first outdoor colony was established. The plant was then quite common in and around Pietermaritzburg, chiefly occurring along the roads and at the borders of fields. Now for many miles few living plants are left. In a single year from the time the insect got to them many of the most vigorous plants, even those upwards of ten feet in height and having stout trunks many inches in diameter, were quite killed. Already nothing but a few dried out stumps remain where there used to be veritable walls of the plant, and it seems probable that in a few years it will be difficult to find the insect for the reason that there will be almost nothing left for it to feed on. Only the one common kind of prickly pear has been attacked and odd plants of other kinds that grew amongst Monacantha plants have been left standing quite unharmed. Some persons have actively spread the insect by introducing infested joints of the plant to previously clean plants, but apparently much of its spread has been accomplished by natural agencies. The Monacantha prickly pear is not the common pest prickly pear of the Karroo, but it is plentiful in many districts, especially on waste lands in and near towns. It is a very spiny kind easily distinguished from any of the other prickly pears of this country by its more scraggly, sprawling appearance, and by the small size, thinness, and bright green colour of the young joints. It fruits abundantly but the fruit is practically worthless.

50. The pinned insect collection of the Division at Pretoria has been considerably augmented during the year by entomologist in charge of it, Mr. David Gunn. This officer also has charge of the insectary work at headquarters and during the year has traced the life cycle and studied the habits of several common pest insects, notably the bagrada bug (*Bagrada hilaris*), lucerne caterpillar (*Colias electra*), and cabbage moth (*Plutella maculipennis*). Special reports embodying the new information gleaned by these studies will be prepared in due course. The fig borer (*Phryneta spinator*) is also being intimately studied by Mr. Gunn, while his major subject for investigation has remained the false codling moth (*Enarmonia batrachopa*). Important progress has been made in ascertaining the native fruits attacked by the latter insect, and encouraging results have been obtained from sprays applied for the destruction of its eggs.

51. Entomologist C. K. Brain spent the major part of his time during the year on a monograph study of the scale insects of South Africa, a work of great economic as well as systematic importance owing to the prominence of scale insects as plant pests, particularly in orchards, and the necessity of an authoritative determination of our species in connection with our nursery inspection and plant import inspection. The monograph is being published in three or more parts in the "Transactions of the Royal Society of South Africa." The first part was issued in November, 1915. It occupies 130 pages of letterpress and is illustrated by text charts in addition to twelve full page plates comprising 72 figures. A second part of equal importance was nearly ready for the publisher at the close of the year.

52. The Assistant Chief of the Division, Mr. Claude Fuller, had little time to spare from administrative duties but such as there was he devoted to a continuance of his studies on the structure and economy of termites or white ants. Parts of his results have been published under the title "Observations on some South African Termites" in the Annals of the Natal Museum, October, 1915. The text extends to 175 pages and is illustrated by 14 text figures and 11 plates embodying about 120 figures. These studies are necessary to place the Division in a position to advise the public efficiently in regard to remedial measures for white ants. There are a large number of different kinds of these creatures and the remedies applicable to some are quite ineffective against others easily confused with them.

53. The Cape Entomologist, Mr. C. W. Mally, with Assistant Entomologist C. P. van der Merwe, at the Cape Town branch, had to give much time to routine work apart from special studies. Important progress, however, has been made by his branch on several subjects, chiefly in continuation of investigations started in the previous year or earlier. House fly studies have been kept up and an arsenical "baiting" measure for the suppression of this pest brought to a high degree of development; its utility being demonstrated by its adoption in military camps. The most approved formula for the bait is 1 lb. arsenite of soda (80 per cent. white arsenic strength), 10 lbs. cheap sugar, and 10 gallons of water. The underlying idea is to poison the flies before they begin to lay their eggs, and to this end the bait is sprinkled every few days over rubbish heaps and on non-absorbent surfaces where the flies congregate. In stables and about buildings, cut branches of trees having hard, smooth leaves are hung up to receive the bait which must of course be kept away from animals. Measures to suppress house ants are also being developed. One new idea of value is the employment as bait of ground biltong (air dried strips of flesh) poisoned with a 10 per cent. solution of arsenite of soda. This is taken by some ants when poisoned syrup is ignored. Fumigation for the grape vine mealy bug has also been carried a step

forward, and Mr. Mally now has hope of facilitating the cyanide fumigation of plants in general by introducing liquified hydrocyanic acid. He has interested a chemist who is taking steps to produce the liquid commercially. On exposure to air, the liquid volatilizes almost instantaneously, producing gas without any admixture of injurious acid and in a state that Mr. Mally believes from his experiments to be even more effective than gas generated in the ordinary way.

54. The studies on insects injurious to the wattle tree by Entomologist C. B. Hardenberg and his technical assistant Mr. G. C. Haines were continued without interruption throughout the year. These officers have a well equipped field station at New Hanover, Natal, in the heart of the wattle country. The studies were started in January, 1913, and are chiefly designed to ascertain what can be done to effect the control of the wattle bagworm and prevent the still unelucidated trouble termed froghopper injury. Incidentally a host of miscellaneous insects that feed on the wattle tree are being studied. Experiments conducted two years ago gave support to the hope that "dust spraying" with an arsenical powder would prove an efficient remedy for the bagworm, and a motor driven dust-blower for a trial on an extensive scale was imported in the year under review. Unfortunately it arrived rather later and the tests made with it were not satisfactory. They will be repeated in the present year. Tests on the practicability of trapping the male moths as a means of controlling the bagworm are also projected. A voluminous preliminary report on his work was submitted by Mr. Hardenberg in the 1914-1915 year but the necessity for restricting the expenditure on Government printing still prevents its publication. A valuable scientific paper of considerable length to record studies and observations has since been prepared and is being published in the Annals of the Natal Museum. Mr. Hardenberg and his assistant are both serving under special contracts that expire early in the 1917-1918 financial year.

CHAS. P. LOUNSBURY,

Chief Division of Entomology.

APPENDIX XI.

DIVISION OF CHEMISTRY.

ANNUAL REPORT, 1915-1916.

The Staff during this period has consisted of:—Chemist, H. J. Vipond; Assistant Chemists, B. de C. Marchand and B. J. Smit; Analytical Assistant, H. F. L. Bischoff; Office and Laboratory Assistant, L. Kibel. The Chemist has been absent on active service in Europe during the whole of the past year.

Analytical Work.—The amount of analytical work done on behalf of the public has been considerably less than in previous years, though the total amount of analytical work done has been about normal. No rough physical examinations only of soils have been made, all soils examined having been partially analysed in addition to the rough physical examination as hitherto.

Nature.	No. of Samples.		Nature.	No. of Samples.	
	Received.	Analysed.		Received.	Analysed.
Soils	71	43	Waters	6	5
Fertilisers	35	24	Maize	12	12
Lime and Limestones	7	7	Dairy Products ..	3	3
Feeding Stuffs ..	14	10	Miscellaneous ..	26	21

In addition to the above, 20 soils were analysed mechanically, and 36 were analysed for special constituents, nitrates and ammonia, while 98 soils and sub-soils collected from the Hartebeestpoort area were either completely or partially analysed.

Soils.—None of the soils analysed on behalf of the public or for other Divisions present any very striking features. The general characteristics are poverty in lime and phosphates, and a sufficiency of potash in an available form.

Class I.—Soils with good percentages of nitrogen (*i.e.* over 0.15 per cent.). Of the 7 soils in this class one was subjected to the complete routine analysis, while 6 were partially analysed to determine manurial needs. One of these soils, No. 3957, was analysed on behalf of the Division of Botany, in connection with the investigations on potato diseases.

These soils are, in common with most South African soils, deficient in lime and phosphates in an available form, but plentifully supplied with "available" potash.

Class II.—Soils with good percentages of Lime (*i.e.* over 0.25 per cent.). Most of these soils show the usual deficiency in "available" phosphoric oxide, though the deficiency is less marked than in soils containing an insufficient supply of lime.

Class III.—Heavy soils. All the soils in this class are reddish brown loams deficient in lime and "available" phosphates, though all contain a fair supply of nitrogen

Class IV.—Medium to sandy loams. As usual, this class is by far the largest of all. These soils are characterised by a general deficiency in lime and plant food, with the exception of potash.

These soils are all well supplied with potash in an available form, and if manured with basic phosphates, lime and leguminous crops should be greatly improved. Seven of these soils were analysed in connection with the Division of Botany's experiments on potato diseases.

Class V.—Sandy soils. With the exception of one, all these soils were analysed on behalf of the Division of Botany.

They are all well supplied with "available" potash, but are deficient in lime and "available" phosphoric oxide. Lime, basic phosphates, and green manuring are recommended in order to bring these soils into good condition.

The average composition of the soils in each class is given in the subjoined table. The increase in the amount of "available" phosphoric oxide with increased lime content is very marked.

Class.	Number of Analyses.	Lime.	Magnesia.	Nitrogen.	"Available" Potash.	"Available" Phosphoric Oxide.
		%	%	%	%	%
I.	7	0·30	0·78	0·205	0·0171	0·0048
II.	7	0·90	0·38	0·088	0·0170	0·0067
III.	4	0·12	0·16	0·120	0·0110	0·0006
IV.	14	0·08	0·19	0·088	0·0235	0·0012
V.	7	0·11	0·10	0·071	0·0235	0·0027

During this year the work of analysing the soil samples taken from the area to be covered by the Hartebeestpoort Irrigation Scheme was continued. About 98 soils and sub-soils were either fully or partially analysed. The investigations into the movement of moisture in, and the nitrate content of, the Koedoespoort red loam were continued up to May. 24 samples were taken and analysed for moisture, ammonia, and nitrates.

MANURES.

A larger number of samples of Bat guano than usual were received for analysis. This is owing to the difficulty of procuring artificial manures. The analyses of Bat guano, showing for the most part the usual low grade of this material, are given in the following Table :—

Number.	3811.	3812.	3813.	3869.	3880.	3904.	3911.	3919.	3966.	3982.
	%	%	%	%	%	%	%	%	%	%
Stones	3·33	29·40	5·69	7·33	nil	13·80	2·54	19·96	—	9·13
Nitrogen	1·288	1·260	0·616	0·770	1·344	0·756	3·640	1·008	6·496	0·532
Phosphoric Oxide :										
Soluble in 2% Citric Acid ..	1·52	3·24	0·06	2·50	—	—	—	—	—	—
Insoluble	1·16	6·20	0·64	5·83	—	—	—	—	—	—
Total	2·68	9·44	0·70	8·33	2·91	13·75	8·03	3·59	5·65	2·70
Potash	0·24	1·30	trace	0·59	0·35	1·57	0·83	0·95	0·97	0·39

The analyses of 16 samples of fertilisers and substances which it was proposed to use as fertilisers are given in the subjoined Table III. The mixed fertilisers are mostly the commercial articles, and the analyses of these emphasises the necessity for legislation to control the sale of these materials. The average grade has, however, been somewhat higher than has been observed in previous years. The sale of such materials as Nos. 3,837, 3,849 and 3878 should be entirely prevented.

FERTILISERS AND SUBSTANCES PROPOSED AS FERTILISERS.

No.	Nature.	Nitrogen.	Phosphoric Oxide.				Potash.
			Soluble in water.	Soluble in 2% Citric Acid.	Insoluble	Total.	
		%	%	%	%	%	%
3810	Mixed fertiliser	3·05	nil	2·14	0·92	3·06	2·29
3818	,, ,, ...	0·91	2·54	5·39	0·82	8·75	4·63
3833	,, ,, ...	6·16	—	9·38	5·05	14·43	—
3837	,, ,, ...	1·32	0·19	3·36	0·63	4·18	3·61
3844	Wood ashes	—	—	—	—	0·10	0·12
3849	Mixed fertiliser	1·62	0·08	0·98	0·16	1·22	3·26
3875	Soot	0·28	—	4·11	1·31	5·42	—
3877	Mixed fertiliser	5·29	3·04	8·52	2·73	14·49	0·06
3878	,, ,, ...	1·99	—	—	—	3·37	0·17
3909	,, ,, ...	4·84	4·75	4·54	2·20	11·49	0·17
3917	,, ,, ...	2·30	2·75	8·72	1·31	12·78	0·77
3933	Superphosphate	—	17·23	0·16	0·78	18·17	—
3934	Bone meal	3·02	—	17·79	9·05	26·84	—
3951	Filter-press cake	0·52	nil	11·99	1·05	13·04	1·79
3958	Mixed fertiliser	0·90	13·54	1·04	1·61	16·19	0·48
3972	Coal	1·51	—	—	—	—	—

Limestones.—6 samples of limestone were analysed. The analyses, given in subjoined Table, show that all are suitable for agricultural purposes. No. 3,826 was a soft, white substance, nearly pure calcium carbonate. No. 3,883 is a marl. All these samples are from the Transvaal, and show that, while the soils of this Province are in general poor in lime, lime in the form of high grade and easily pulverised limestone is available to supply the deficiency. The price of such materials is, however, very high in proportion to the agricultural value.

LIMESTONES.

Number	3826.	3838.	3879.	3883.	3915.	3916.
	%	%	%	%	%	%
Insoluble Matter	1·42	7·15	15·82	—	22·91	9·81
Iron Oxide and Alumina	0·25	1·66	3·98	—	5·98	0·77
Lime	54·21	50·27	41·80	35·70	36·93	48·88
Magnesia	0·58	0·40	0·67	—	0·90	0·54
Loss on Ignition	43·12	40·28	37·26	—	33·20	39·70
Total	99·58	99·76	99·53	—	99·92	99·70

Feeding Stuffs.—Quite a large number of feeding stuffs were analysed. 4 samples of maize, viz.: 2 samples of Hickory King and 2 of Iowa Silver Mine, were analysed for Departmental information in connection with feeding of mine natives. The conclusion is drawn from results of these analyses that there is no practical difference in the feeding values of these two varieties. 14 samples of native and other grasses were analysed on behalf of the Division of Botany. The results are extremely interesting, and show that Kikuyu grass is vastly superior in feeding value to any of the others, the value being more comparable to that of a legume than a grass. I understand that the good qualities indicated by the analysis are actually observed in practice.

Analyses of the ash constituents of these grasses have been made in most cases. The results are not quite complete, so are not quoted here, though they are of considerable interest. The ordinary analyses for feeding purposes are given in the following Table:—

Number.	Feeding Stuffs. Name.	Moisture.	Protein.	Fat (Ether Extract).	Carbon-hydrate.	Crude Fibre.	Ash.	Nitrogen.	Albumenoid Nitrogen.	True Protein.
3766	Ischaemum glaucostachyum	9·34	7·14	1·57	31·00	41·18	9·77	1·142	0·784	4·90
3767	Warmbaths grass	10·94	8·33	1·72	35·22	34·56	9·23	1·333	0·980	6·13
3768	Panicum Nigropedatum	8·68	9·24	1·51	33·23	35·26	12·08	1·478	1·036	6·47
3769	Ehrharta longiflora	9·42	10·18	2·94	33·06	32·62	11·78	1·630	1·036	6·47
3770	Erogostis sp.	7·91	6·58	1·80	43·78	34·50	5·43	1·053	0·868	5·43
3775	Panicum miliaceum	9·28	10·89	1·59	33·44	38·60	6·20	1·742	1·316	8·23
3776	Bontelona curtipendula	7·00	7·00	1·46	37·62	37·88	9·04	1·120	0·980	6·13
3777	Digitaria sp.	6·93	8·12	1·68	33·94	39·68	9·65	1·299	0·882	5·51
3779	Kikuyu	8·29	12·36	1·79	35·06	33·08	9·42	1·977	1·330	8·31
3780	Trichloris sp.	8·06	7·32	1·66	32·91	40·80	9·25	1·170	0·896	5·60
3781	Heteropogon contortus	8·28	7·35	1·89	30·96	43·04	8·48	1·176	0·938	5·86
3782	Setaria lindenbergiana	9·04	7·07	2·01	28·42	43·62	9·84	1·131	0·882	5·51
3783	Setaria aurea	9·04	6·09	1·58	30·37	43·34	9·58	0·974	0·770	4·81
3784	Panicum maximum	8·02	9·03	1·68	28·63	40·54	12·10	1·445	1·134	7·09
3884	Maize, Hickory King	11·15	9·80	4·31	72·16	2·25	1·33	1·568	—	—
3885	Maize, Iowa Silver Mine	10·42	10·89	3·90	71·01	2·49	1·29	1·743	—	—
3886	Maize, Hickory King	10·34	11·11	4·60	70·72	2·24	0·99	1·778	—	—
3887	Maize, Iowa Silver Mine	12·12	8·93	4·07	71·11	2·64	1·13	1·428	—	—
3914	Brewer's grains (dried)	7·83	23·28	7·02	38·18	20·32	3·37	3·724	3·668	22·93
3924	Soya bean cake	13·69	44·23	6·18	23·98	5·82	6·10	7·077	6·802	43·14
3925	Teff hay	8·96	8·31	1·23	36·22	38·85	6·43	1·330	1·162	7·26
3926	Lucerne hay	8·85	17·68	3·16	34·13	27·82	8·36	2·828	2·562	16·01
3927	Maize stover	9·30	4·66	1·47	43·54	38·26	2·77	0·745	0·560	3·50
3928	Mielie meal	12·30	9·03	4·96	70·09	2·05	1·57	1·445	1·428	8 93

MISCELLANEOUS.

11 samples of maize and one of Kaffir corn were tested for moisture; 2 samples of butter were examined on behalf of the Dairy Division; 3 samples of bark were examined for their tannin content; and 3 samples of arsenite of soda and one of dipping tank liquor were analysed. The 3 former, purporting to be 80 per cent. arsenite of soda, all fell considerably below this amount. 5 samples of water and 4 samples of deposits supposed to contain nitrate of potash were also analysed.

Salt.—In connection with the inquiry made by the Department into the cause of the injury of hides during curing, 4 samples of salt were analysed. These are all brine salts prepared from sea-water by evaporation, and the figures show that even by the very crude methods in use a fairly pure salt may be obtained.

Brine Salts.

Number.	Moisture.	Insoluble in water.	Sodium chloride.	Calcium sulphate.	Magnesium chloride.	Sodium sulphate.	Total.
	%	%	%	%	%	%	%
3870	0·40	0·10	96·81	0·58	nil	1·69	99·58
3871	0·65	0·08	97·40	0·58	nil	0·98	99·69
3872	0·46	0·18	94·04	0·46	0·35	4·00	99·49
3873	1·39	0·99	92·88	1·34	0·11	3·15	99·86

Correspondence and Travelling.—The number of letters sent out was 384 These were chiefly reports of results of analysis and answers to enquiries on technical matters.

An officer of the Division attended the agricultural shows at Johannesburg, Bloemfontein (twice), Pietermaritzburg, Durban, Rosebank and Port Elizabeth, with an exhibit. Two new items were added to our show exhibit, one illustrating the chemical composition of a typical soil, and one the mechanical analyses of 6 soils.

During April and May soil samples were taken at Koodoospoort in connection with the investigation into movements of moisture and accumulation of nitrates in the soil.

Correspondence and routine work still occupy a great deal of our time, and the facilities for research in the direction of field experiments or pot experiments are lacking. One or two small investigations have been commenced on methods of analysis, with a view to adopting more efficient and less laborious methods.

We have now definitely replaced the platinum method for the determination of potash in soils and plant ashes by the perchloric acid process, which is less expensive, and at least equally efficient.

B. de C. MARCHAND,

Acting Chemist.

APPENDIX XII.

LIBRARIAN.

ANNUAL REPORT, 1915-1916.

During the year under review 403 volumes were received, and 213 volumes were bound, thus making an addition of 616 complete bound works.

The total number of complete bound volumes now in the Library amounts to 5,645. Bulletins, leaflets, etc., contained in the Library amount to about 133,000. Approximately 11,800 works are deposited with the Division and School Libraries.

The Prisons Department do all the binding for this Department, free of charge, the cost of the material being borne by the Government Printing Works.

The number of bulletins, periodicals, etc., subscribed to, exchanged or received gratis was 1,548, as against 1,217 the year previous.

Some 700 farmers visited the Library during the last year.

The correspondence amounted to: 741 letters and telegrams received, and 808 despatched.

Owing to the financial situation no further supplements to the catalogue of 1911 were published.

The Staff of the Central Library varied during the year, but mainly consisted of the Librarian, a lady clerk and messenger, while the typing was done by Head Office typists.

Purchase of books during the year 1915-1916.

	Complete Works.			Periodicals.			Total.		
(1) For the Department :	£	s.	d.	£	s.	d.	£	s.	d.
Library	109	14	9	114	11	1	224	5	10
Division of Veterinary Research	16	19	8	72	14	8	89	14	4
Division of Botany	9	14	7	15	11	8	25	6	3
Division of Entomology	12	5	2	15	13	9	27	18	11
Veterinary Division	—			43	5	0	43	5	0
Division of Chemistry	1	0	0	3	17	11	4	17	11
Division of Dairying	—			3	10	9	3	10	9
Division of Viticulture..	1	1	0	7	4	0	8	5	0
Various other offices	4	5	3	18	5	8	22	10	11
Total (1)	£155	0	5	294	14	6	449	14	11
(2) For Agricultural School Libraries :									
Glen	2	16	3	13	0	5	15	16	8
Cedara	23	8	1	37	18	9	61	6	10
Potchefstroom	14	11	10	28	6	5	42	18	3
Grootfontein	10	12	7	34	9	5	45	2	0
Elsenburg	9	18	7	34	5	3	44	3	10
Total (2)	£61	7	4	148	0	3	209	7	7

The expenditure on books has been much less than it was the previous year, 1914-1915, and the reason for this is because only a very small part of our orders was executed, the rest being delayed through the war.

Books have been lent to the public on payment of a deposit, and the amounts on hand from the deposits were at 31st March, 1915, £10 1s.; 31st March, 1916, £49 1s.

In February, 1916, it was arranged to make the Library a circulating one, and to allow anyone in the Union to borrow books on payment of a deposit of not less than £1, the books being carried post free both ways. The scheme is now developing rapidly, and promises to be successful.

Just recently all the duties connected with the printing and distribution of departmental publications have been handed over to the Librarian.

The agricultural publications are divided into 5 classes, *i.e.*, General Series, Local Series, Science Bulletins, Annual Reports, Press Circulars, The General Series are circulated as follows:—

Members of Parliament: English	121	
Dutch	57	
Officers of the Department of Agriculture	135	
Magistrates and Justices of the Peace	312	
Consuls in the Union	50	
Public Institutions, etc. (Chambers of Commerce and Educational Bodies)	159	
Private persons of note in the Union (including Heads of Government Departments)	16	
Foreign Exchanges	808	
Libraries in the Union	262	
Newspapers in the Union	254	
Agricultural Societies and Farmers' Associations, etc.	397	
		2,571

The publications belonging to the Local Series are only issued to addressees within the Union of the above list.

The Science Bulletins are distributed to Officers of the Department of Agriculture, Members of Parliament, Libraries in the Union and Foreign Exchanges.

Some 580 copies of the Annual Reports are distributed to certain foreign exchanges (Institutions from whom similar publications are received by the Department), and Institutions and Foreign Governments who have specially asked for them.

The Press Circulars are issued to the Newspapers and to the Agricultural Societies and Farmers' Associations in the Union.

A list of 176 publications which have appeared from the hands of officers of the Department is annexed. These publications consist of 21 numbered pamphlets, 1 science bulletin, 11 miscellaneous unnumbered pamphlets, 97 roneoed pamphlets (including 7 crop reports dated from October, 1915, to March, 1916, 22 pamphlets on various matters, and 68 press circulars), 3 catalogues of stock sales and 3 annual reports.

PAUL RIBBINCK,
Librarian.

ANNEXURE LIST OF ABOVENAMED PUBLICATIONS

(a) *Numbered Pamphlets.*

1.4.15 to 31.12.1915.

No. 72. "The Composition of Natal Wattle Bark" (Second Article) by C. Williams, B.Sc., A.R.C.Sc.
No. 73. "Curing Cigar Tobacco," by W. B. Wilson, B.Sc.Agr.
No. 74. "Export of Oranges," by R. A. Davis, Chief, Division of Horticulture.
No. 75. "Locust Destruction," Issued by the Division of Entomology.
No. 77. "Aptha or Vesicular Stomatitis: 'Tongziekte.'" by C. E. Gray, M.R.C.V.S., Principal Veterinary Surgeon (Union).
No. 78. "The Eye and Its Diseases," by D. Hutcheon, M.R.C.V.S., Late Chief Veterinary Surgeon, Cape of Good Hope.
No. 79. "Biliary Fever or Malignant Jaundice of the Dog (Canine Piroplasmosis)" by W. Jowett, I.R.C.V.S., D.V.H., Veterinary Surgeon, Cape of Good Hope.
No. 80. "Ephemeral Fever or Three Days' Sickness in Cattle," by G. W. Freer, M.R.C.V.S., Veterinary Surgeon, Cape of Good Hope.
No. 81. "The Manuring of Land," by T. G. W. Reinecke, B.A., Lecturer in Chemistry, School of Agriculture, Potchefstroom.
No. 82. "Why Cream Tests Vary and How to Produce First Grade Cream," by E. O. Challis, Superintendent of Dairying of the Union of South Africa.
No. 83. "The Mally Fruit Remedy," issued by the Union Division of Entomology.

1.1.16 to 31.3.16.

No. 1. "Raisin Making in South Africa," by I. Tribolet, Lecturer in Horticulture, School of Agriculture, Elsenburg, Mulder's Vlei, C.P.
No. 2. "Report on the North African Ostriches Imported into South Africa in 1912," by R. W. Thornton, Principal, Prof. J. E. Duerden, M.Sc., Ph.D., (officer in charge of Ostrich Investigations) and F. C. Smith, Assistant in Ostriches.

No. 3. "Results of Experiments at Experiment Station, Robertson, C.P.," Report prepared by Mr. A. E. Darvall (Late Manager) with the assistance of the Staff of the School of Agriculture, Elsenburg.
No. 4. "Pig-feeding Experiments conducted at the School of Agriculture, Potchefstroom," by A. M. Bosman, B.S.A., Vice-Principal and Lecturer in Animal Husbandry.
No. 5. "The Pepper Tree Caterpillar, Eombycomorpha pallida, Dist.," by D. Gunn, Entomologist, Union Division of Entomology.
No. 6. "The Potato Ladybird Beetle, Epilachna dregei," by D. Gunn, Entomologist.
No. 7. "The Plum Slug Caterpillar, Parasa latistriga," by D. Gunn, Entomologist.
No. 8. 1. "Some Destructive Fruit and Flower Beetles," 2. "A New Insect Pest of the Peach," by D. Gunn.
No. 9. "The Cucumber and Vegetable Marrow Fly, Dacus vertebratus," by D. Gunn.
No. 10. "South African Agriculture: an Analysis," by P. J. du Toit, Under-Secretary for Agriculture.

(*b*) *Science Bulletin.*

No. 7. "A Study on the 'Dry Rot' Disease of Maize, caused by Diplodia Zeae (Schw) Lev.," by Paul A. v. d. Bijl, M.A.F.L.S., Mycologist, Pretoria.

(*c*) *Miscellaneous Unnumbered Publications.*

"A Disease of Young Pepper Trees (Gloesporium Sp.)," by M. Bottomley, B.A., Professional Assistant, Division of Botany.
"Black Heart of Potatoes," by Ethel M. Doidge, D.Sc., F.L.S.
"Anthrax," by C. E. Gray, Principal Veterinary Officer.
"Cyanide Fumigation of Citrus Orchards," by C. P. Lounsbury, Chief, Division of Entomology.
"Practical Agricultural Pipe Drainage," by E. Parish, B.Sc., Vice-Principal, Elsenburg College.
"Crown-Rot or Wilt Disease of Carnation caused by a Fungus Fusarum Sp.," by Paul A. van der Bijl, M.A., Mycologist, Division of Botany.
"Symptoms of Plant Diseases." by Paul A. van der Bijl, M.A.
"The Department of Agriculture of the Union of South Africa. A Short Account of Its History, Organization and Activities," by P. J. du Toit, Under-Secretary for Agriculture.
"Directions for the Use of Blue Tongue Vaccine."
"Directions for Preparing Blood Smears."
"Immunization of Cattle against Redwater and Gallsickness." The Transvaal Brands Directory for 1915.

(*d*) *Roneoed Pamphlets.*

"Cattle Raising in South Africa," by G. J. Bosman, Department of Agriculture.
"Through the Stock Yards of Chicago: the Meat Market of the World," by G. J. Bosman, Department of Agriculture.
"Farm Cheesemaking."
"Cream Cheese (Gervais)," by Ed. O. Challis, Superintendent of Dairying.
"Coulommier Cheese," by E. O. Challis, Superintendent of Dairying.
"Report on the First Egg-Laying Competition held at the School of Agriculture and Experiment Farm, Potchefstroom: 1.5.14 to 30.4.15," by R. Bourlay, Poultry Inspector, Potchefstroom School of Agriculture.
"A System of Marking and Recording Pedigree Stock," by Alex Holm, Experimental Farm, Potchefstroom.
"Final Awards made in the first Maize Growing Competition for Lads in the Transvaal."
"Profit in Poultry," by Arthur Little, Lecturer in Poultry, School of Agriculture, Grootfontein, Middelburg, C.P.
"Special Course in Dairying at the School of Agriculture, Grootfontein, Middelburg, C.P.," (January to August, 1917) by Alex Holm, Under-Secretary for Agriculture.
"The preservation and conservation of Egg Products," by W. C. John, Lecturer in Poultry, School of Agriculture, Elsenburg, C.P.
"Report on Inspection and Examination of Birds at the Western Province Laying Competition, Rosebank," by W. C. John, Elsenburg.
"Progress of Hop Growing in South Africa," by G. Shaw Scott, Horticulturist, School of Agriculture, Glen, O.F.S.
"The Wintering of Yearling Oxen, 1914," by E. Harrison, Cedara.

"Ox Fattening Experiments at Cedara, 1914-15," by E. Harrison, M.S.A., B.Sc., Principal, School of Agriculture, Cedara.

"The Ensiling of Farm Crops," by J. Fisher, B.Sc., Lecturer in Agriculture, School of Agriculture, Cedara.

"The Rotation of Crops," by the Lecturer in Agriculture, Cedara.

"The Algerian Oat Crop," by the Lecturer of Agriculture, Cedara.

"The Cowpea," by the Lecturer in Agriculture, Cedara.

"Interim Report on an Experiment dealing with the effect on the Quality of Milk by Feeding Bone Meal," by E. Harrison, Principal, School of Agriculture, Cedara.

"Our Agriculture:—Review of Trade Returns, 1911-1915," by P. J. du Toit, Under-Secretary for Agriculture.

Monthly Crop Reports, Nos. 1—7.

"Instructions for Crop Reports Correspondents. What is Wanted and how the Cards should be Filled in," by P. J. du Toit, Acting Secretary for Agriculture, 23.11.15.

And 68 Press Circulars.

(c) *Annual Reports.*

Report of the Acting Secretary for Agriculture for the Year 1914-15 as presented to Parliament.

Report on Agricultural Education for the Year 1913-14, as presented to Parliament.

The Third and Fourth Reports of the Director of Veterinary Research, November, 1915.

APPENDIX XIII.

DIVISION OF CO-OPERATION.

ANNUAL REPORT, 1915-16.

Progress Made by Societies.

Profits, 1915-16.—During the year under review the operations of some Societies resulted in a loss, the total of which amounts to £2,403 9s. 9d., while other Societies made a total profit during the same period of £8,567 6s. 8d. For the year 1914-15 the figures were respectively £8,965 3s. 7d. and £5,568 19s. 9d.

Members' Fund.—In 1915 the Members' Fund of the Societies amounted to £46,141 1s. 6d. as compared with £37,004 16s. 5d. in the previous year.

Reserve for Bad Debts.—The amount provided by the Societies for Bad Debts has increased from £10,966 7s. 3d. in the year 1914 to £12,829 11s. 3d. in 1915.

Transactions of Societies.—The following statement is a summary of the transactions of the Co-operative Agricultural Societies registered in the Transvaal and the Orange Free State in the years 1912—15:—

		1912.	1913.	1914.	1915.
Produce sold on behalf of members:					
Maize	bags	879,000	639,452	740,706	919,891
Tobacco	lbs.	2,496,635	3,464,514	2,000,000	2,057,203
Other (Value)..	£	104,000	87,434	90,746	107,039
Value of machinery, etc., sold to members	£	167,000	193,684	136,719	139,052

It will be noticed that more maize was sold during the year 1915 than in any previous year.

Although this information is not shown in the above Statement, it will be interesting to know that the members' deliveries of maize to the Societies during the current season (not *sales* during the *calendar year*) amounted to 868,535 bags as compared with 711,255 bags during the previous season, and this notwithstanding the fact that the Bethal Society's deliveries during the current season were 67,587 bags less than those of the previous season.

The sales of tobacco during the year 1915 compare favourably with those in 1914, although they were considerably less than those of the year 1913, or even 1912, when the production was greater.

It will be observed that although there is a slight increase in the value of machinery, etc., sold during 1915, as compared with 1914, there is a considerable decrease in the value sold in 1915 as compared with the years 1913 and 1912. This is, of course, chiefly due to the restrictions put on the credit sales.

It cannot be said that the progress made by individual Societies has been invariably good, or that I am entirely satisfied with the manner in which their affairs have been conducted. The present position of two or three Societies is very unsatisfactory, as will be noticed from my remarks under the heading "Present position of Societies." But, as the figures quoted show, the Societies have, on the whole, had a good year and have materially strengthened their financial position.

The principal aim of a Society is, of course, to obtain for its members the highest possible price for their produce, and I think it may be said that, in this also, they have, on the whole, attained a fair measure of success during the past year.

The Societies still require to be constantly watched and supervised, but hard experience has taught them, amongst other things, that the attainment of the best results is dependent upon efficiency and good management, and also upon the early adjustment of certain defects which experience has disclosed in connection with the movement.

There is certainly a distinct improvement noticeable in the manner in which the majority of the Societies conduct their business. Time will, however, be required to remedy the more serious mistakes that have been made by the Societies during the early period of their existence. To my mind the most serious of these was the custom of giving indiscriminate credit to members in connection with the sale of farming implements. There is hardly a Society which does not feel the effects of it to-day, and will continue to do so for a long time to come.

There can also be no doubt that much of the disloyalty amongst members arises from these outstanding accounts, inasmuch as members are tempted to sell their produce outside of the society when they know that by delivering it to the Society the advances due to them in respect of the produce delivered would be placed to the credit of their accounts in the books of the Society and that they could not expect to receive any cash payment on delivery of the produce.

POSITION OF INDIVIDUAL SOCIETIES.

Bethal Landbouw Ko-operatieve Vereeniging.—In my last annual report I expressed the opinion that the whole future of this Society depended on the loyalty of the members and that it remained to be seen to what extent that loyalty had been affected by former mismanagement.

A discouraging feature now is the fact that, while nearly all the other Societies have received from their members more maize during the 1915-16 season than during the previous one, there is a shortfall of 67,587 bags in the deliveries of this Society.

The Society's Reserve for Bad Debts amounts to £2,400, but this would seem to be quite inadequate. The Directors have at my request examined all the outstanding accounts, and in their estimation the Bad and Doubtful Debts amount to £4,277 0s. 4d.—all made while the late Secretary was in charge of affairs. The total amount owing by members, exclusive of advances, is over £20,000.

Although there can be no doubt that many members who owe large amounts have, for obvious reasons, sold their maize outside of the Society, it seems to me that the shortfall in the deliveries of maize is mainly to be attributed to the fact that, as a consequence of the extraordinary manipulations of the 1914 maize Pool Account, conducted by the late Secretary, the distribution made by the Society in the 1914 maize account was considerably less, per bag, than that made by any other Society.

The Auditor's report for the year ended 31st May, 1915, shows a net loss for that period of £275 6s. 8d. The Members' Fund stands at £786 10s. 2d.

Summary of transactions for the last 3 years:—

	1913.	1914.	1915.	
Produce—				
Mealies sold	115,000	128,628	157,992	bags
Value of other produce sold	£2,484	£628	£2,285	
Farming Requisites—				
Value of machinery, etc., sold to members ..	£15,721	£15,112	£5,460	

Centraal-Westelike Ko-operatieve Landbouw Vereeniging.—The Balance Sheet for the financial year ended 31st May, 1915, shows that the revenue for that period exceeded the actual expenditure by £118 2s. 1d., which sum was, however, not sufficient to cover the amount that had to be written off for depreciation.

The Members' Fund stands at £1,342 11s. 10d., as compared with £1,295 3s. 1d. at the end of the previous year.

The amount standing to the debit of members is £34,179 13s. 10d., against which there is a sum of £23,355 7s. 7d. still to be credited to members' accounts in respect of produce sold.

The business of this Society is, on the whole, well conducted.

Summary of transactions for the last 3 years:—

	1913.	1914.	1915.	
Produce—				
Mealies sold	56,919	46,413	104,560	bags
Value of other produce sold	£346	£1,019	£400	
Farming Requisites—				
Value of machinery, etc., sold to members ..	£13,797	£3,034	£9,600	

Ermelo Ko-operatieve Vereeniging.—The operations of this Society for the year ended 31st December, 1915, have resulted in a net profit of £676 12s. 8d., after allowing £427 3s. 6d. for depreciation, which is very satisfactory.

The Members' Fund stands at £3,810 13s. 8d., as compared with £3,081 1s. 0d. at the end of the previous year.

Summary of transactions for the last three years:—

	1913.	1914.	1915.	
Produce—				
Mealies sold	12,000	47,000	76,294	bags
Value of other produce sold	£2,300	£4,000	£9,500	
Farming Requisites—				
Value of machinery, etc., sold to members ..	£9,000	£10,700	£12,711	

Heidelberg Ko-operatieve Landbouw Vereeniging.—The Auditor's report and financial statements for the financial year ended 30th June, 1915, disclose a loss of £288 3s. 0d.

The Members' Fund stands at £452 18s. 7d.

The Secretary of this Society was arrested in the beginning of November last, and has since been convicted on the charge of having misappropriated about 1,400 bags of the Society's maize, whereby the Society has suffered a loss of £520.

A reorganisation of the staff has since been effected and it is anticipated that the Society will soon recover from the slight set-back received as a consequence of the late Secretary's misconduct.

As the Society's transactions with its members are mostly for cash, the position of the members' accounts is quite sound.

Summary of transactions for the last three years:—

	1913.	1914.	1915.	
Produce—				
Mealies sold	26,000	35,649	44,707	bags
Value of other produce sold	£5,035	£2,687	£1,048	
Farming Requisites—				
Value of machinery, etc., sold to members ..	£4,849	£2,614	£2,956	

Hoogeveld Eendracht Boeren Ko-operatieve Vereeniging.—During the financial year ended 31st May, 1915, actual working operations resulted in a profit of £2,047 10s. 2d., which figure has been debited with £1,000 as a further reserve for Bad and Doubtful Debts, and with £556 1s. 0d. for depreciation on buildings, etc., leaving a net profit of £491 9s. 2d.

The Members' Fund now stands at £6,547 10s. 6d., as compared with £5,276 6s. 3d. at the end of the previous financial year. Included in this is an amount of £2,349 7s. 9d. collected from members for the purchase of fixed property.

Good progress continues to be made by this Society, but a rather large amount is outstanding amongst members, in respect of which, however, the Society has a reserve of £1,750.

Summary of transactions foi the last three years:—

	1913.	1914.	1915.	
Produce—				
Mealies sold	89,537	136,390	125,436	bags
Value of other prodnce sold	£8,892	£2,800	£4,020	
Farming Requisites—				
Value of machinery, etc., sold to members ..	£13,024	£16,915	£7,349	

Koster Ko-operatieve Landbouw Vereeniging.—The financial statements for the year ended 30th June, 1915, disclose a loss of £345 16s. 2d., as compared with £683 12s. 4d. at the end of the previous financial year.

The Members' Fund stands at £103 15s. 0d., while there is a reserve for Bad and Doubtful Debts amounting to £313 14s. 2d.

The position of this Society has been greatly improved since the complete reorganisation referred to in my last report was effected.

Summary of transactions for the last three years:—

	1913.	1914.	1915.	
Produce—				
Mealies sold	5,105	10,640	16,810	bags
Value of other produce sold	£3,030	£830	£1,300 4 0	
Farming Requisites—				
Value of machinery, etc., sold to members ..	£10,247	£695	£4,403 5 6	

Lichtenburg Ko-operatieve Landbouw Vereeniging.—During the financial year ended 31st May, 1915, the working operations of this Society resulted in a profit of £34 3s. 5d.

The Members' Fund stands at £4,193 16s. 1d.

An unsatisfactory feature in connection with the Society is the rather large amount which is outstanding among members and in respect of which no special reserve has yet been established.

The amount so outstanding is £34,150 15s. 0d., against which there is £182 14s. 10d. to be credited to members in respect of produce sold.

Summary of transactions for the last three years:—

	1913.	1914.	1915.	
Produce—				
Mealies sold	84,445	81,159	109,500	bags
Value of other produce sold	£5,363	£4,663	£7,783	
Farming Requisites—				
Value of machinery, etc., sold to members ..	£21,797	£5,258	£12,783	

Lydenburg Ko-operatieve Landbouw Vereeniging.—This Society continues to make good progress. The profit for the financial year ended 31st May, 1915, was £1,216 14s. 2d.

The Members' Fund stands at £5,272 6s. 11d., an increase of £1,269 9s. 2d. during the period ended 31st May, 1915.

Summary of transactions for the last three years:—

	1913.	1914.	1915.	
Produce—				
Mealies sold	14,580	15,416	9,500	bags
Value of other produce sold	£8,500	£15,125	£12,400	
Farming Requisites—				
Value of machinery, etc., sold to members	£2,000	£2,500	£3,700	

Magaliesberg Ko-operatieve Tabakplanters Vereeniging.—During the financial year ended 29th February, 1916, the working operations of the Society resulted in a loss of £450 6s. 7d., after having provided £861 3s. 6d. for depreciation.

The Members' Fund stands at £7,156 0s. 11d. The financial position of this Society is quite sound.

Summary of transactions for the last three years:—

	1913.	1914.	1915.	
Tobacco sold	3,464,514	2,000,000	2,057,203	lbs.

Marico Boeren Ko-operatieve Vereeniging.—The financial statements for the year ended 30th June, 1915, disclose a further loss of £338 13s. 5d., and the amount now standing to the debit of the Profit and Loss Account is £2,565 17s. 7d.

The outstanding accounts amount to £6,621 16s 7d., against which there is a reserve for Bad Debts amounting to £2,000.

The position of this Society is very unsatisfactory, for reasons already stated in previous reports of this Division.

A complete reorganisation was effected during the year and at a General meeting of members held in January, which I attended, it was decided to continue the business until the next annual general meeting is held. If by that time no improvement is noticeable the Society will probably go into liquidation.

Summary of transactions for the last three years:—

	1913.	1914.	1915.	
Produce—				
Mealies sold	776	307	3,322	bags
Value of other produce sold	£4.582	£2,252	£3,720	
Farming Requisites—				
Value of machinery, etc., sold to members	£5,991	£1,789	£1,780	

Middelburg Landbouwers Ko-operatieve Vereeniging.—The financial statements for the year ended 30th June, 1915, disclose a further profit of £673 2s. 6d., after setting aside £500 for Bad Debts.

The Members' Fund now stands at £3,617 8s. 5d., while the Society has a Reserve of £1,700 for Bad Debts, as compared with £2,637 5s. 11d. and £1,200 respectively at the end of the previous financial year.

In the case of this Society, too, members have in the past been treated with undue leniency in respect of credit transactions. Strong representations have been made to the Directors in regard to this matter and great improvement is noticeable.

At the 30th June, 1914, the members' accounts outstanding amounted to £29,703 2s. 3d., of which £21,696 was unsecured. At the 30th of June, 1915, the figures were respectively £21,361 9s. 5d. and £9,822 8s. 4d. The position of this Society is otherwise quite satisfactory.

Summary of transactions for the last three years:—

	1913.	1914.	1915.	
Produce—				
Mealies sold	76,000	115,043	134,715	bags
Value of other produce sold	£2,137	£1,486	£2,334	
Farming Requisites—				
Value of machinery, etc., sold to members	£23,380	£18,914	£23,645	

Olifantsrivier Ko-operatieve Dorschwerk.—This Society carries on threshing operations.

The financial statements for the year ended 31st December, 1915, show a net profit for that period of £8 17s. 9d., after allowing £173 1s. 9d. for depreciation.

The Members' Fund amounts to £1,438 17s. 7d., while the Society has also a reserve of £150 for bad debts.

In the case of this Society, too, the outstanding members' accounts, which represent threshing fees only, are unduly large. The amount owing is £1,215 7s. 5d., part of which is due since 1912.

Pretoria Landbouw Ko-operatieve Vereeniging.—The operations for the 12 months ended 29th February, 1916, resulted in a further loss of £1,136 10s. 7d.

Of the 63 members who comprise this Society only very few have had any dealings with it during the past year. The Society is not making any headway, and I am of opinion that it should be dissolved.

Summary of transactions during the last three years:—

	1913.	1914.	1915.
Produce—			
Mealies sold—	1,463	5,471	8,636 bags
Value of other produce sold	£2,511	£3,733	£1,146
Farming Requisites—			
Value of machinery, etc., sold to members ..	£873	£821	£626

Rustenburg Boeren Ko-operatieve Vereeniging.—The financial statements for the year ended 30th September, 1915, disclose a net profit of £358 3s. 1d., after setting aside £281 5s. 9d. for depreciation and £400 for bad and doubtful debts.

The Members' Fund stands at £2,624 8s. 7d., while the Society has now also a reserve of £1,509 0s. 4d. for bad debts.

Apart from the fact that the members' accounts outstanding are somewhat large and not properly secured, the progress made by this Society is satisfactory.

Summary of transactions for the last three years:—

	1913.	1914.	1915.
Produce—			
Mealies sold	600	2,281	11,167 bags
Value of other produce sold	£3,741	£19,809	£18,849
Farming Requisites—			
Value of machinery, etc., sold to members ..	£11,083	£13,241	£8,978

Standerton Ko-operatieve Boeren Vereeniging.—Good progress continues to be made by this Society. The financial statements for the 7 months ended 31st October, 1915, of the Produce Branch of the Society, disclose a net profit for that period of £1,980 18s. 8d. The Members' Fund of this Branch now stands at £3,758 16s. 11d. The Butchery Branch of this Society is also progressing favourably.

The profit made during the 7 months under review is £502 4s. 1d., while the Members' Fund now amounts to £1,037 9s. 6d.

I am, however, not satisfied with the manner in which advances are being made on cattle required for slaughter purposes, and have made representations to the Directors in regard to this matter.

Summary of transactions for the last three years:—

	1913.	1914.	1915.
Produce—			
Mealies sold	25,617	40,000	77,992 bags
Value of other produce sold	£4,242	£13,795	£21,300
Farming Requisites—			
Value of machinery, etc., sold to members ..	£13,800	£13,500	£17,900

Vrede Ko-operatieve Landbouw Vereeniging.—The financial statements for the year ended 31st May, 1915, show a net profit for that period of £812 16s. 0d.

The Members' Fund stands at £1,520 19s. 3d.

The manner in which the affairs of this Society have been conducted in the past leaves much to be desired. A re-organisation was effected during the period under review and although an improvement has since been noticeable in some respects, there are several matters which still require adjustment. I also find that sufficient care is not yet being exercised to prevent the accumulation of outstanding accounts, which are becoming a source of great weakness to the Society.

Summary of transactions for the last three years:—

	1913.	1914.	1915.
Produce—			
Mealies sold	29,754	11,600	13,770 bags
Value of other produce sold	£11,179	£4,800	£12,410
Farming Requisites—			
Value of machinery, etc., sold to members ..	£20,784	£17,470	£17,742

Waterberg Landbouwers Ko-operatieve Vereeniging.—The Balance Sheet for the financial year ended 31st July, 1915, shows a loss for that period of £182 8s. 0d., after setting aside £128 11s. 11d. for depreciation and £77 19s. 1d. for bad debts.

The Members' Fund stands at £494 14s. 9d., while the Society has also a reserve for bad debts amounting to £250.

This is a small Society, which, like the Marico Society, was operating for a number of years in a district very badly affected by drought.

The turnover of the Society has always been very small, and now that another dry season is being experienced in the Waterberg district, the future prospects of this Society would not appear to be very bright.

Summary of transactions for the last three years:—

	1913.	1914.	1915.	
Produce—				
Mealies sold	4,848	8,200	10,000	bags
Value of other produce sold	£1,604	£1,000	£1,500	
Farming Requisites—				
Value of machinery, etc., sold to members ..	£2,990	£1,600	£3,000	

Wolmaransstad Ko-operatieve Landbouw Vereeniging.—The financial year ended on the 30th June, 1915.

The Balance Sheet shows a profit for that period of £39 1s. 8d., after making due provision for depreciation, and also after the sum of £100 had been charged to the Profit and Loss Account as a further reserve for bad and doubtful debts.

The Members' Fund stands at £1,288 13s. 11d.

The Society is making fairly good progress, the only unsatisfactory feature being the members' outstanding accounts, which are unduly large.

Summary of Transactions for the last three years.

	1913.	1914.	1915.	
Produce—				
Mealies sold	15,895	12,670	15,490	bags
Value of other produce sold	£5,602	£4,396	£7,045	
Farming Requisites—				
Value of machinery, etc., sold to members ..	£12,257	£6,062	£6,418	

MEMBERSHIP OF CO-OPERATIVE AGRICULTURAL SOCIETIES.

The following is a list of Societies actively engaged in the transaction of business, showing for the purpose of comparison the membership of the various Societies as at the 31st March, 1915, and the 31st March, 1916:—

Name of Society.	No. of Registered members at 31.3.15.	No. of Registered members at 31.3.16.
Transvaal.		
Bethal Landbouw Ko-operatieve Vereeniging	556	505
Centraal-Westelijke Ko-operatieve Landbouw Vereeniging ..	514	567
Ermelo Ko-operatieve Vereeniging	181	229
Heidelberg Ko-operatieve Landbouw Vereeniging	172	182
Hoogeveld Eendracht Boeren Ko-operatieve Vereeniging ..	643	666
Koster Ko-operatieve Landbouw Vereeniging	745	718
Lichtenburg Ko-operatieve Landbouw Vereeniging	1,377	1,394
Lydenburg Ko-operatieve Landbouw Vereeniging	287	304
Magaliesberg Ko-operatieve Tabak-planters Vereeniging ..	2,457	2,467
Marico Boeren Ko-operatieve Vereeniging	322	273
Middelburg Landbouwers Ko-operatieve Vereeniging	771	815
Olifantsrivier Ko-operatieve Dorschwerk	195	211
Pretoria Landbouw Ko-operatieve Vereeniging	76	63
Rustenburg Boeren Ko-operatieve Vereeniging	886	884
Standerton Ko-operatieve Boeren Vereeniging	485	494
Waterberg Landbouwers Ko-operatieve Vereeniging	303	253
Wolmaransstad Ko-operatieve Landbouw Vereeniging ..	243	307
Orange Free State.		
Vrede Ko-operatieve Landbouw Vereeniging	427	493
Membership at 31st March, 1915, of Potchefstroom Society, since removed from Register	1,191	—
Total	11,831	10,825

It will be noticed that the withdrawal of the Potchefstroom Society involves a loss of 1,191 members. But for this loss there would have been an increase of close on 200 members in the total membership.

In considering these figures it must also be borne in mind that Societies have been more active in the matter of expulsion. The number of members expelled during the period under review is 121. These were all old members who figured in previous lists for some years.

Another point for consideration is the fact that, as a result of representations made by this Division to the various Societies, the acceptance of applications for membership is no longer a mere matter of form. The applications are well scrutinised by the Directors and only those applicants who are likely to become useful members are accepted. It was formerly the custom to accept every application.

REMOVAL OF SOCIETIES FROM REGISTER.

One Society has been removed from the Register during the period under review, namely, the Potchefstroom Ko-operatieve Landbouw Vereeniging, which was dissolved by Order of the Supreme Court on the application of five of the members.

The circumstances under which this action was decided upon are dealt with in the Annual Reports of this Division for the years 1913-14 and 1914-15.

The Balance Sheet for the financial year ended 30th June, 1912, showed that the Profit and Loss Account had a credit balance at that date of £2,647 8s. 10d., while the Members' Fund stood at £4,409 5s. 4d.

As a result of an investigation conducted by this Division in the beginning of the following financial year, the Balance Sheet at 30th June, 1913, showed a loss of £23,546 19s. 4d., while the Members' Fund amounted, at that date, to £4,892 10s. 4d.

A thorough re-organisation took place in 1912, and in spite of the fact that the Society was subsequently well conducted, from an administrative point of view, no progress towards recovery could be made for the reason that members had lost all confidence in the Society.

REGISTRATION OF NEW SOCIETIES.

Although no new Societies were registered during the period under review, it can be confidently expected that, especially in the Free State, further Societies will be formed during the following financial year.

At the time of writing the registration had already taken place of one new Society which will soon be carrying on active operations in the Free State, whilst two other Societies are in course of formation.

CENTRAL AGENCY.

On the 30th June, 1915, the aggregate of the accumulated profits and the Reserve Fund (not including issued capital) amounted to £4,828—or an increase of £2,584 during the financial year ended at that date.

Certain Societies do not support the Agency as loyally as could be wished, but a steady progress is being maintained and the institution is exercising valuable consolidating influence upon the various Societies which are affiliated with it.

JOHS. RETIEF,

Registrar of Co-operative Agricultural Societies.

APPENDIX XIV.

DIVISION OF DRY-LAND FARMING.

ANNUAL REPORT, 1915-16.

The Programme of Work that was laid down (under 15 sections) in last year's report has been followed out by my small staff and myself as far as possible throughout the Union.

Investigations, Lectures and Field Demonstrations.—The demand for the services of the Division, from farmers and farmers' associations, etc., from many parts of the Union, was so great that it was not possible to comply with half the requests received during the period under review. The farmers of some of the outlying districts and centres, far away from a railway, have persistently and year after year been clamouring for my services, and in many instances I was compelled to disappoint them time after time, because, with the exception of a very short period, I have been the only lecturer and demonstrator of my Division, besides having to direct experiments on our experiment stations, attend to a very heavy correspondence, etc. Consequently very little time was left me to go on very long road tours, which not only take up much money out of my travelling vote but also keep me away for long periods from my experimental and office work. However, the closing down, during the last financial year, of the Warm-Baths, Pretoria, and Vryburg Dry-Land Stations has given me a little more time to visit some of these outlying districts and I shall try my best to visit some more of such centres during the next financial year. During the year under review I have visited and worked at 157 places throughout the Union, and it is very gratifying to see how keen the farmers are to learn more about the conservation of soil-moisture, the proper and timely cultivation of their lands, the use of up-to-date agricultural implements, the selection of seeds, the growing of more and (to them) new profitable crop varieties, trees, grasses, root-crops, etc. There is undoubtedly a marked awakening among our farmers with regard to the studying of their soils and climatic conditions, the value of conducting experiments for themselves on their own farms, the careful preparation of their seed-beds, the destruction of weeds on their cultivated acres, the value of humus in their soils, the increasing of the water-holding capacity and fertility of the soil, reading of agricultural literature, etc. Our farmers are beginning, notwithstanding the many set-backs, such as droughts, hail, vermin and untimely frosts, to believe in the agricultural possibilities of their own country, and I am also glad to say that their faith in the work and aims of the Department of Agriculture and its officials is continually growing stronger, hence the increased number of advice-seeking farmers and letters from year to year. My work brings me in contact with very many farmers throughout the Union and the awakening and forward movement of numbers of South African farmers is certainly very encouraging, but I do not wish, by the above remarks, to convey the impression that *all* South African farmers are wide awake seeing that many are still fast asleep and a lot of shaking will be required to wake them up and make them see things for themselves.

For instance, some farmers are still using rather primitive agricultural implements and seem to have no idea of the draught, setting and balance of an ordinary plough; and it generally takes a deal of explaining and demonstrating to convince them that an unbalanced, cheap and bad plough may weigh much less in lbs. on a scale than a good and well balanced plough, but that the draught of the badly balanced implement will register more weight through the ground than is the case with the good plough. A shackle-scale proves this invariably when both implements are drawn the same depth through the same soil. Harrows, cultivators, and planters are still looked upon by some farmers as new and useless things; fortunately there are not very many such agriculturists and their number is declining fast. Many farmers again attach too little attention to the physical condition, the proper and timely preparation of their lands, the growing of profitable rotation crops, the incorporating with the soil of organic matter, the maintaining of soil fertility, the enriching of exhausted and partly exhausted soils, and so on. In many instances lands are robbed of every particle of natural fertility and then artificial or stable manures are injudiciously and recklessly applied. Some owners of small and also comparatively large farms sow or plant a few things on the small and naturally fertile patches on their farms, and the sandy, gravelly or stony parts are severely left alone, while the farm owner goes out speculating among his neighbours or in other districts. This partly accounts for the swarms of speculators one comes across in some districts. It has in numerous cases been proved by energetic farmers that apples and other fruit and also forest trees will in most cases grow well in such stony or gravelly places when properly worked. Sweet potatoes, pea-nuts and many other crop varieties will thrive in sandy or gravelly soils when proper attention is paid. The thinking and hardworking farmer under the same conditions enriches his soil and grows profitable plants and crops, keeps pigs, fowls, cows, bees, etc., as the case may be, and is unlike his neighbour who is generally both an unsuccessful farmer and an unsuccessful speculator and is of little use to both his neighbour and the State. I also find that many farmers do not even take the trouble to store sweet grass, mealie stalks or any other feeding stuffs for their animals in winter—much less do they prepare for a drought by conserving soil moisture in summer; with the result that they lose some stock every year, that they have no milk or butter in winter and no crops in a dry summer. Some still firmly believe that smut in crops is caused by a cold south easterly wind, potato-rot by the moon, scab on sheep by all other causes excepting by the well-known psoroptes communis. I could name many more such instances that I have seen in connection with my work over the Union, but the general and good progress of our farming community from year to year, the clamouring for more knowledge about scientific methods, the display of more commonsense and patience, will undoubtedly in a not too distant future eclipse the primitive party in the old groove.

Co-operative Experiments with Farmers.—Allow me please to repeat, that it will certainly be unwise and short sighted, even under the most charitable analysis, to say or claim that dry-farming in its present state of development is possible in howling deserts or in every portion of the arid or semi-arid regions throughout South Africa. We have, however, quite enough experimental evidence to prove that there is an enormous acreage of fertile land all over our sub-continent which falls within the zones of possible and profitable dry-farming. So vast is this uncultivated acreage that it will take decades if not generations to develop the whole of it properly into model farms or "holdings," and in order to allow my staff and myself more time to visit and investigate more of such areas and advise farmers on the spot, the Minister of Agriculture last year ordered the closing down of three Dry-Land Stations. We have therefore been able to move more among the farmers than in previous years. Mr. Trollope, the officer in charge of the Pietersburg Experiment Station, has done much good work among the farmers of that enormous district. My clerical assistant has attended most of the principal Agricultural Shows throughout the Union with our Divisional exhibit, thereby relieving Mr. Trollope to work Zoutpansberg district and myself to attend, as far as possible, to the rest of the Union.

Lecturing and demonstrating to many farmers' gatherings throughout the country have done an enormous amount of good, and the cultivated areas have vastly increased, but it has always struck me that not enough profitable crop-varieties out of the very many thousands known to agriculturists throughout the world are known to and tried by our farmers who live in areas where many such (to them) new varieties will grow and yield excellently. In many districts only a few varieties of wheat, barley, oats, beans, peas, grasses, lucernes, fruit and timber trees, etc., and other root-crops are known. The general complaint is that they do not know where to get the seed of such new varieties and if they do get it they are never sure whether it is the right thing, how or when to plant, how to prepare the seed-bed, or what kind of soil to select. We have therefore last year, aided by the Magistrates of the different districts in the Union, selected some 300 reliable farmers, who were more than willing to conduct co-operative experiments with us, providing we assist them to procure the seeds, mark and name the varieties, describe suitable soils, the preparation thereof, manner of seeding, etc. In return the farmer undertakes to execute the work according to methods in our prescript, accompanying such seeds; he must also render, after harvest time, a short detailed report with regard to growth, yields, rust or drought resistant qualities as the case may be. He further undertakes to enlighten and assist his farmer neighbours as far as possible. In some cases the Magistrate of a district has bought the seeds from us; has then again distributed them among a number of reliable farmers in his district. In other cases we have sent small parcels of seeds weighing 5 lbs. and under to many individual farmers, free of charge. The reports that reach us from time to time from these co-operating farmers, scattered over the Union, are not only encouraging and instructive, but breathe decidedly of keen interest and a desire for more knowledge. The great value to us of such co-operative experiments is (a) that there is no cost attached, excepting value of the seeds; (b) that crop varieties are simultaneously being tested all over the Union, and from results obtained one can gauge fairly accurately in *one year's* time whether a certain crop variety is drought-hardy, rust-resistant or rust-proof as the case may be, or whether beans, peas, root-crops, etc., do well or not under certain climatic conditions, in certain soils; (c) the interest of the farmer and his inclination to carry out experiments are being kept awake; (d) the acreage of cultivated areas will extend much faster by this process. Only two instances out of many are given here. The district of Namaqualand (17,500 square miles) may be divided into three parts, viz.:—On the East—Bushmanland (mostly Bastard-Sheep and Goat farming); Middle—Kammies and Kuurkam mountains (Wheat Belt, Sheep, Goats, Cattle, Horses, etc.); West—Zandveld (Bastard-Sheep and Goats). The Zandveld adjoins the Atlantic Ocean on the West and the Kuurkam on the East, is some 250 miles long with an average width of about 60 miles. This area is not really sand but mostly a rich silt. The majority of Namaqualand farmers knowing only Wolkoren (an awnless variety) could never succeed in getting this one variety to bear seed on the Zandveld. The growth and ears were invariably good but "empty" ears were always the result, and farmers fully believed that small grain crops could only be grown in the mountains. Some three years ago a farmer wrote and explained the trouble. We forwarded him three varieties of heavily bearded wheats and also rye, with the result that two of these and the rye are doing very well on the Zandveld and a number of Zandveld farmers have last year successfully grown the varieties sent by us. It will not be very many years before the Zandveld will be a wheat-producing area. The other case was in Bushmanland, where farmers never even attempted to grow anything. On request of two advice-seeking farmers we have forwarded some durum seeds, pea-nuts, rye, beans, etc. The result was that some 6 farmers have already been very successful in raising good crops. It can, however, not be predicted that the Bushmanland will be a grain producing area, because red lime beds appear over a great portion of this area, but parts where the soil is soft and good can be made productive. A limited number of Rhodesian as well as Australian farmers, who got seed from us, have also faithfully reported results obtained by them.

Co-operative Dry-Land Experiment Stations with Municipalities and other Public Bodies.—At the present moment none of these Stations is actively conducting experiments. The reason is that at none has a reliable foreman been permanently appointed by the public bodies concerned, in compliance with the rules and regulations governing such stations. It was utterly impossible for me to conduct experiments personally at the different co-operative stations and it was therefore agreed to leave this matter until after the great war now in progress.

Government Dry-Land Experiment Stations.—The Pietersburg Dry-Land Station is conducted in co-operation with the Municipality of that town and although it does not fall under the same category as the other co-operative dry-land experiment stations the fact remains that the Lichtenburg Station is now the only remaining Station in the Union which is a purely Government Institution. It was a great pity that circumstances did not permit the continuation of the Government Station at Vryburg, because it is so very essential that we must first grow and test the many new crop varieties at the different stations before we can recommend the same to our numerous advice-seeking farmers. We have, however, tried our best to conduct as many experiments as was possible at the two remaining stations. In previous years we have mostly experimented with such winter crops as rye, barley, oats, many varieties of wheat, etc. These experiments were in the first place conducted to prove that it is possible, in those regions of the Union where rain falls only during the spring or summer, to conserve enough moisture in the ground during the summer months, to grow and mature crops upon and, secondly, to find out which of the many varieties are the best drought resistants and yielders. That sufficient moisture can be conserved to grow and mature crops upon, in deep, rich soils or in soils containing a fair amount of humus and of which the water-holding capacity is good, has undoubtedly been proved to our own satisfaction and that of many of our farmers. With regard to the best drought-resistants and yielders, I may mention that we have up to the present experimented with some 45 varieties of wheat alone, and out of this number we have selected 9 varieties which have given the best results with regard to drought or rust-resistant qualities and yields. It will, however, be premature to state that these 9 varieties are the best for all dry-land purposes because many more varieties are left to be tested, and we continue to conduct experiments with new varieties of winter wheats on a small scale from year to year. For the last 3 years, however, the demands for information with regard to rust-proof or rust-resistant wheats and oats were so insistent that we were obliged to minimise the winter wheat experiments for a time and probe into the matter of rust-resistant wheats and oats. The experiments with a number of varieties had to be conducted on a small scale and also in co-operation with a number of reliable farmers living in the more humid parts of the Union. The results obtained have been stated fully in my report of last year, but since then we have received many statements from co-operative farmers from which it would appear that "Black Don" durum is practically a rust-proof wheat, while "Chernouska" durum is exceedingly strong rust-resistant. "Hajira" oats is absolutely a rust-proof and also an excellent drought resister. Very good rust and drought-resistant results have, during the period under review, been obtained from the 2 durums "Nicaragua" and "Pellissier" but these have to undergo further tests before a definite statement can be made. I have an idea that "Pellissier" crossed with "Candeal" or "Sarui-bugda" ought to result in a thorough rust-proof variety. It was on account of the war impossible to get the various varieties for rust-proof purposes from Russia, Greece or Algiers and this has to a great extent retarded the work. The demand for seed of the varieties mentioned in last year's report was so enormous that we could not supply one-tenth of it.

Beans and Potatoes.—The number of letters received at this office for the last 3 years on bean and potato culture on the dry-land system, was very great, and we had to extend our variety experiments in that direction also. Fifteen bean varieties not hitherto tried by us have been experimented with during the year. In this number is not included legumes for green manuring or fodder purposes, such as velvet beans, white and yellow lupines, cow-peas, soya and kaffir beans, vetches, pea-nuts, etc. The best yielders and drought-resistants were so far "Case Knife" French Yellow, Sword Bean, Haricot, Canadian Wonder and Bush Lima.

The success with which potatoes have been grown on the dry-land system by us and also by farmers who followed our advice, seems to have awakened many more farmers to the great possibilities of potato culture in the Union. The varieties which have up to the present done the best are Northern Star, Cotter, Factor, Flour-Ball, Five-Tower and Scottish Triumph. Variety tests of both beans and potatoes, are being extended by us.

Acreage Cultivated.—In compliance with the wish of the Minister, directed to me through the Secretary for Agriculture, namely, to conduct experiments on a smaller scale; extend variety tests; economise as much as possible, and move more among the farmers with a view to encouraging them to conduct experiments on their own farms, the acreage cultivated on the two existing stations was less than in previous years, viz.: Lichtenburg 300 and Pietersburg 200 acres. These areas include moisture fallow-lands, green-manuring and fodder-crop beds as well as experimental plots.

Yields.—The soil on the Pietersburg Station contains a fair amount of natural fertility, but that of the Lichtenburg Station is exceedingly poor, shallow, sandy and gravelly and it is practically impossible to raise a decent wheat crop without either green or other manures. For potatoes stable or kraal manures have to be used. Good stable and kraal manures are very scarce in these parts. The percentage of humus is too meagre in our soils to conduct manurial experiments on wheat with artificial manures and a marked increase in yield on artificial manures will undoubtedly cause farmers, in these parts, to clamour for Government guano instead of bringing organic matter into the soil for wheat growing purposes.

Wheat: Average Yields. Groups of wheat with very little difference in yielding powers.
Durums as Winter Wheats (on green-manured moisture beds).

Chernouska, Pellissier, Nicaragua	1,028 lbs. per acre.
Black Don	954 ,, ,,
As Summer Wheats.	
Chernouska, Pellissier, Nicaragua	945 lbs. per acre.
Black Don	882 ,, ,,
Soft Varieties (Triticum Vulgare).	
Gluyas Early, Holstrooi, Egyptian Red	1,064 lbs. per acre.
Klein Koren and Wol Koren	1,045 ,, ,,
Hajira Oats (green manure)	10 bags per acre.
Barley (Cape Six-rowed) (green manure)	10 ,, ,,
Rye. Green Manure	8 ,, ,,
Potatoes. No manure	22 ,, ,,
,, Green manure	30 ,, ,,
,, Kraal manure	65 ,, ,,
Beans. Slightly stable manured, Bush Lima and "Case Knife"	5 ,, ,,
Canadian Wonder, French Yellow and Sword	4½ ,, ,,
Maize. (No manure) at Pietersburg Station, Hickory King, Parkinson's Silver, Golden Beauty and Eureka	10 ,, ,,
Iowa Silver Mine	9 ,, ,,
White Cango and German Yellow	8 ,, ,,
Lichtenburg. Hickory King (No manure), virgin soil	7 ,, ,,
White and Yellow Cango (No manure), virgin soil	6 ,, ,,
Mangels. (Kraal manure) Pietersburg	15 tons per ac

The following fodder and other crops have also been grown successfully by us:—Millets, Teosinte, Artichokes, Teff, Sorghum, Pumpkins, Spineless-Cactus, Mantataan and T'sama mellon, Beggar Weed (Desmodeum tortuosum) Chou Mouellier, Pea-Nuts, Raffia, Linseed, Field Peas, Dhal Beans, Lucerne and Guada Beans. *Noteworthy Experiments may perhaps be the following:*—

Guada Bean.—This beautiful bean is a good climber and the tendrils are vigorous and strong. The pods are round with conical points and with a diameter of some 2 to 3 inches and a length of 3 to 5 feet. Some writers say that pods of over 7 feet long have been grown. Analysis of this bean shows a high percentage of nutriment and personally we have found it delicious as a table bean when green. It is a very heavy bearer and it continues to bear until the frost kills it. The fruit grows and ripens in stages. On one stool is generally seen many flowers and young pods in their different advanced stages up to the full-grown pod. Our Co-operative farmers have nothing but good to say for this bean and they have found it most excellent for all kinds of livestock. We cannot say yet whether it is drought hardy or not, but stock farmers and especially those who live in the dry summer regions of the Union, say, that if they have a few hundred stools of this bean they have no fear that their stock will suffer, even if they have to carry or cart water for the beans. The Guada bean is not unknown in South Africa, but I do not know whether it has hitherto been put to the use of stock-feed. It grows well at Lichtenburg and we shall this year plant much more as the demand for seed is enormous and then we shall have enough for a stock-feed test. The seed of this bean has cost us 3d. per single seed.

Dhal Bean (Cajanus indicus).—Largely imported from India as a food-stuff for the Indian population. It grows freely in the Bush-veld and in Rhodesia, but it was thought that it would not thrive in the Western Transvaal. It has, however, grown magnificently at Lichtenburg on poor soil, without any manure. The good qualities of the Dhal bean are well known. The seed of this variety sells at the present moment at 2s. per lb.

Dry-Land Lucerne.—Some years ago a friend sent me a pamphlet from Colorado, U.S.A. A new and hitherto unknown variety of an exceedingly drought-hardy lucerne was described as having been discovered to grow wild, in practically arid regions. Dr. Langmann, of New York, obtained some seed for me and I at once distributed small samples of seed to a number of Union farmers in our drier regions. The Co-operative reports were unanimous about the good qualities of this lucerne under dry conditions. We have only last March sown this variety on the experiment station and it is too early to judge, but I have given the local Magistrate a few pounds of seed more than a year ago and I must say that I have never seen a lucerne doing so well on dry-lands and under dry conditions as this particular variety, as previous experiments have shown that lucerne on dry-lands do well on good soil and when good and timely rains fall; but in exceptionally dry seasons it can only serve for grazing off the lands, as it makes no stand as it does under irrigation. More results will be obtained next year from Co-operative farmers and ourselves.

Chicory has been successfully grown by us on a small scale and our experimental evidence shows that it can be grown on such a large scale in the Union that we need not import Chicory from oversea.

Pea-Nuts. (Arachis hepogea) *Large Tennessee Red and Virginian Mammoth.*—It is generally taken for granted that every Agriculturist throughout the Union is thoroughly *au fait* with the pea-nut and its value as a pig and stock-feed, but I have found that comparatively very little was known about it, excepting, of course, by those farmers who live in warm or semi-tropical climates. I have in my travels over the Union tried to push the pea-nut, and, it is really marvellous to see how well it grows in almost all parts of the Union and especially as a soil renovator on poor, sandy soils; and now that our farmers are beginning to see that their calling is a highly scientific problem and not a degrading job, we have much reason to hope that South Africa will ultimately take its rightful place among the Agricultural Countries of the world.

Late or Winter Apples.—The success of apples on dry-lands at Lichtenburg has, so to speak, forced the interest of many farmers, and it is really encouraging to see the number of farmers who have gone in for apple growing. Many local farmers have come for "slips" from our apple trees.

Our Rust-proof Oats and Wheat, reported in last year's report have drawn much attention, and reports from our co-operative farmers bear out the results obtained by us.

Staff.—Mr. G. J. Bosman has been transferred to the Division for Agricultural Education and nobody has as yet been appointed permanently in his place. Mr. Trollope has been transferred from Lichtenburg to Pietersburg as responsible Officer-in-Charge, and Mr. Bester was transferred from Pietersburg to Lichtenburg as Field Foreman-in-Charge.

Visitors and Correspondence.—The number of advice-seeking visitors, also advice-seeking letters have greatly increased since my last report, and this number is bound to increase after the termination of the War.

The following statements are annexed:—

1. Table showing rainfall at Lichtenburg and Pietersburg.
2. Record of experiments conducted at Lichtenburg, 1915-16.
3. Record of experiments conducted at Pietersburg, 1915-16.
4. Miscellaneous statistics.
5. Statement of Receipts and Expenditure for the year ended 31st March, 1916: Experiment Stations at Lichtenburg and Pietersburg.

H. S. DU TOIT,
Government Dry-Land Agronomist.

ANNEXURE 1.—RAINFALL (INCHES) 1ST APRIL, 1915, TO 31ST MARCH, 1916.

		Lichtenburg.	Pietersburg.
April,	1915	0·46	0·00
May,	,,	1·23	0·20
June,	,,	0·00	0·00
July,	,,	1·63	2·38
August,	,,	0·00	0·00
September,	,,	0·29	0·92
October,	,,	2·02	2·36
November,	,,	4·00	2·22
December,	,,	2·17	3·73
January,	1916	3·00	2·51
February,	,,	1·19	0·65
March,	,,	2·83	7·27
		18·82	22·24

ANNEXURE 2.—RECORD OF EXPERIMENTS CONDUCTED ON THE GOVERNMENT DRY-LAND EXPERIMENT STATION, LICHTENBURG, 1915–16.

VARIETY.	Time of Seeding.	Rate of Seeding per Eng. Acre.	Acres Planted. No.	Time of Harvesting.	Yield per Eng. Acre.	REMARKS.
Wheat (Durum):						
"Chernouska"	July 1	35 lbs.	1	Nov. 29	1,032 lbs.	A heavy, mixed crop of Velvet and Kaffir Beans were growing on these plots and were ploughed under in February, previous to sowing as a green manure.
"Pellissier"	,,	37½ ..	1	,, 24	1,028 ,,	
"Nicaragua"	..	37½ ,,	1	.. 24	1,026 ,,	
"Black Don"	..	37½ ,,	1	,, 15	954 ,,	
Spring or Summer Crops:						
"Chernouska"	September	40 lbs.	1	Dec. 28	948 lbs.	These plots were the previous year under potatoes; the ground was manured—5 loads of kraal manure before potatoes were planted—so that the soil was not devoid of humus. "Chernouska" and "Pellissier" were slightly affected by rust in the leaves only, but the straw and grain were quite sound. "Nicaragua" was more infested, and the grain was not so good. "Gharnovka" was totally destroyed by rust. Rainfall during growing period was 8.2 inches, with dry, hot weather between the showers.
"Pellissier"	,,	40 ,,	1	,, 24	946 ,,	
"Nicaragua"	,,	40 ,,	1	,, 24	943 ,,	
"Gharnovka"	,,	40 ,,	1	See	Remarks.	
"Black Don"	Oct. 28	40 ,,	1	Jan. 31	882 lbs.	Planted on similar ground as the other summer wheats. No rust detected. 12 inches of rain during growing period.
"Red Victoria" (Tvl.) ..	,, 28	40 ,,	1	See Remarks.		Treated exactly as "Black Don," but destroyed by rust.
Wheat (Soft):						
"Gluyas Early"	July	37½ lbs.	½	End Oct.	533 lbs.	Gluyas Early, Holstrooi and Egyptian Red work out at average of 1,064 lbs. per full acre. Soya beans were ploughed under as green manure the previous February, and in March 300 lbs. of Govt. guano was incorporated with the soil. "Klein Koren" and "Wolkoren" were similarly treated, and would average 1,045 lbs. per acre.
"Holstrooi"	..	37½ ,,	½	Nov.	534½ ,,	
"Egyptian Red"	,,	37½ ,,	½	..	530 ,,	
"Wit Klein Koren" ..	,,	37½ ,,	½	,,	523 ,,	
"Wolkoren"	,,	37½ ,,	½	..	522 ..	
Oats:						
"Hajira"	Dec. 4	70 lbs.	5	March 9	1,532 lbs. from 2 acres*	Black clay soil in vlei. No manure. This variety has already been fully described in previous reports, and is undoubtedly rust-proof.
Barley:						
Cape six-rowed	August	40 lbs.	1	End Nov.	1,498 lbs.	Moisture bed. Black clay land (vlei). Lupines ploughed under as green manure.
Barley Wheat	,,	37½ ..	½	,,	415 ..	Same soil and treatment as barley.
Rye	December	40 ,,	10	March	—	Cut green as feed for animals.
,, ...	August	35 ,,	1	December	8 bags	Same soil and treatment as the barley.
Potatoes:						
"Northern Star"	November	6 bags	1	March	22 bags	No green or other manures used.
,, ,, ...	..	6 ,,	1	,,	30 ,,	Heavy, mixed crop of Velvet and Kaffir beans ploughed under previous March, and soil kept loose and free of weeds.
.. ,, ...	,,	6 ,,	1	..	65 ,,	Five large wagon-loads of kraal manure were incorporated with soil previous March, and the land kept loose and free of weeds.
"Flour Ball"	January	6 ..	1	May	15 ,,	No manure.
,, ,, ...	,,	6 ,,	1	..	21 ,,	Soya beans ploughed under as green manure.
,, ,, ...	,,	6 ,,	1	,,	50 ,,	Five large wagon-loads of stable manure incorporated in October.
Beans:						
"Canadian Wonder" ..	December	40 lbs.	1	March	4½ bags	Four loads stable manure per acre. N.B.—Small control plots with no manure showed that barley, 1½ bags per acre, would have been realised in our sandy soils.
"French Yellow"	..	40 ,,	1	..	4½ ,,	
Maize:						
"Hickory King"	November	10 lbs.	15	June	7 bags	Virgin soil; well ploughed. Weather hot and dry. Frequent harrowings when crop was small. Intertillage later, to pull crop through.

* 3 acres cut as Oathay.

ANNEXURE 2.—RECORD OF EXPERIMENTS CONDUCTED ON THE GOVERNMENT DRY-LAND EPXERIMENT STATION, LICHTENBURG, 1915–16.—*Continued.*

VARIETY.	Time of Seeding.	Rate of Seeding per Eng. Acre.	Acres Planted. No.	Time of Harvesting.	Yield per Eng. Acre.	REMARKS.
Maize.—*Continued.*						
"White Kango"	November	10 lbs.	5	June	6 bags	Same treatment as "Hickory King."
"Yellow Kango"	,,	10 ,,	5	,,	6 ,,	
,, ,, ...	January	15 ,,	15	April (end)	—	Used for silage.
Millets:						
Italian, Boer and Golden ..	November	10 lbs.	15	February	1 ton hay	No manure. Sown on well-prepared plots. Both Millets and Teff are very poor drought-resisters, especially on poor sandy soil like ours. The straw of the crop was short and the ears small, owing to summer drought and poor soil.
Teff Grass	,,	7 ,,	15	,,	1 ,,	
Kaffir Corn:						
Sudan—Durah	,,	4 lbs.	5	June	10 bags	No manure. Land was previous season under Maize, and soil was rather exhausted. The ears and seeds were not so good as previous years.
White and Yellow Lupines ..	October	40 ,,	25	—	—	Ploughed under as green manure.
Velvet Beans	November	30 ,,	5	February	2¼ tons	Baled for cattle feed.
Cow Peas	,,	30 ,,	2	,,	2 ,,	,, ,,
Kaffir Beans	,,	30 ,,	2	,,	2 ,,	,, ,,
Soya Beans	December	40 ,,	4	,,	—	Ploughed under as green manure.
Buck Wheat	,,	30 ,,	1	March	6 bags	No manure. Straw was rather short.
Pea Nuts ("Tennessee Red") ..	November	75 ,,	1	,,	7 ,,	Grows well on our sandy soils and, being a nitrogenous plant, enriches the soil.
Dhal Beans	December	35 ,,	1	,,	3 tons hay	Stands drought well, and seems to thrive on comparatively poor soil.
Linseed (Flax)	October	5 ,,	2	—	—	Destroyed by insects.
Pumpkins	,,	—	1	March	9 tons	Three loads kraal manure used.
Clover:						
3 Varieties	February	15 lbs.	3	—	—	Germinated well and grew well for some time, then died off.
Exotic Grasses (9 varieties tried)	Different times	—	3	—	—	Germinated badly; made poor growth; ploughed under.
Nara Fruit	September	—	Small Plot	—	—	Tried for 3 years. Germinated well and made vigorous growth for a time; then died off.
Guada Beans	September & October	—	,,	—	—	Does exceedingly well. Fully described in my report 1915-16. Seed sells for 3d. a bean.
Coriander	October	—	,,	—	—	Does very well on manured land. Not good on poor sandy soil.
Chicory	,,	—	,,	—	—	Our first trial. Seems as if it can easily be grown on good soil.
Artichokes, etc.	Sept., etc.	—	,,	—	—	Did well on good vlei land.
Raffia	—	—	Several Plants	—	—	Grows better in warmer climate, but seems to thrive well enough here for local use.
Apple Trees: Late Varieties (sour).	July-August	25 ft. sq.	500 trees	May	—	Planted in 1911 and 1913. Doing excellently. Bearing magnificent fruit and stands drought marvellously well.
Nectarines	—	,,	10 ,,	December	—	Bears and stands drought well.
Apricots	—	,,	10 ,,	November	—	,, ,,
Forest Trees	Dec.-April	6 ft. sq.	15,000 trees	—	—	"Milliodora," Sideroxylan, Crebra, standing drought very well. Acacia Cultriformis very drought-hardy and very ornamental, flowers in winter.
Spineless Cactus	—	—	—	—	—	Doing well.

Lichtenburg Station, 1915-1916 ..
144 acres under various crops. Not including trees.
156 ,, ploughed and harrowed as fallow land.
Total, 300 ,,

ANNEXURE 3.—RECORD OF EXPERIMENTS CONDUCTED ON THE DRY-LAND STATION, PIETERSBURG. SEASON 1915–1916.

Variety.	Size of Plot.	Rate of Seeding per English Acre.	Date Planted.	Date Harvested.	Yield per English Acre.	REMARKS.
Maize :	Eng. Acres					
Hickory King	4	10 lbs.	21.11.15	30.6.16	7½ bags	No manure. This lot was badly affected by witchweed ; fully ¼ gave no yield.
German Yellow ..	2	12 ,,	7.12.15	28.5.16	10 ,,	Witchweed very bad and reduced yield considerably ; no manure.
White Cango	5	14 ,,	5. 1.16	1.6.16	10 ,,	No manure. Witchweed did a little harm.
Golden Beauty ..	1	12 ,,	15.12.15	June, 1916	9 ,,	,, ,, ,,
Eureka	1	10 ,,	16.12.15	,, ,,	8½ ,,	,, ,, ,,
Iowa Silver Mine ..	1½	12 ,,	20.12.15	,, ,,	7½ ,,	This plot got a light dressing of guano ; suffered a little from dry spell.
Parkinson Silver ..	1½	12 ,,	16.12.15	,, ,,	8¾ ,,	No manure ; witchweed reduced yield very much.
Teosinte	½	3 ,,	22.11.15	10.5.16	2 tons hay	This being a slow grower, did not put on much growth.
Potatoes :						
Five Tower	⅛	900 ,,	20.11.15	15.5.16	48 bags	Light dressing of Government Guano.
French Early Rose ..	⅛	900 ,,	20.11.15	9.5.16	48 ,,	,, ,, ,,
Up to Dates	⅛	900 ,,	21.11.15	9.5.16	45 ,,	,, ,, ,,
Mangold Wursel :						
Golden Tankard ..	⅛	4 ,,	24.12.15	3.6.16	6 tons	,, ,, ,,
Boer Manna	1	12 ,,	20.11,15	10.4.16	2 ,,	No manure. Stood dry spell for 6 weeks very well and gave a huge cut.
Flax	¼	30 ,,	16.12.15	10.5.16	3 bags	Light dressing of guano. This crop did exceedingly well.
Summer Wheat :						
Black Don	½	45 ,,	10.12.16	22.4.16	4 ,,	Guano used. This crop suffered a little from drought.
Red Victoria	½	45 ,,	30.12.15	—	—	This crop suffered from rust and was ploughed under as green manure.
Summer Oats :						
Hajira	1½	60 ,,	9.12.15	15.5.16	6 bags	Half of the crop was left for seed and the other half cut for oat hay. A very good rust & drought resister.
Sorghums :						
Sugar Drip	½	3 ,,	15.11.15	—	—	This crop was badly damaged by grubs.
Kaffir Melons	½	1½ ,,	1.11.15	May	12 tons	This crop did exceedingly well on light sandy soil. No manure.
Beans :						
White Horse Tooth ..	½	20 ,,	Dec. 3	—	—	This variety being a very slow grower was caught by frost.
Soya Beans	½	25 ,,	3.12.16	—	—	This crop was totally destroyed by insects.
Yellow Sugar	¼	30 ,,	3. 1.16	10.5.16	2 bags	This crop suffered very badly from insects.
Bush Lima	¼	30 ,,	3. 1.16	10.5.16	2 ,,	,, ,, ,,
Canadian Wonder ..	½	30 ,,	3. 1.16	10.5.16	2 ,,	,, ,, ,,
Kaffir Corn :						
Soudan Durrha ..	4	3 ,,	2.11.15	3.6.16	3 ,,	This crop was almost destroyed by grubs and witchweed.
Velvet Beans ..	1½	20 ,,	6.12.15	25.4.16	1 ton hay	This crop was cut for hay as it was too late for seed.
Cow Peas	1	25 ,,	8.12.15	20.4.16	1½ bags & ½ ton hay	
Buck Wheat	¼	30 ,,	16.12.15	10.3.16	6 bags	
Grasses :						
Teff	4	6 ,,	24.11.15	Feb., 1916	1 ton hay	Teff did not do so well this season owing to insects and drought. Ten varieties of grasses were planted in small acre plots but did not germinate, owing to unfavourable season.

35 acres under Crops.
125 ,, Fallow Land.

		Inch.	Days.		Inch.	Days.		Inch.	Days.		Inch.	Days.	
Rainfall during Season	Sept., 1915	0·92	5	Nov., 1915	2·22	6	Jan., 1916	2·51	5	Mar., 1916	7·27	5	Total 19·92 inches.
1 Sept., 1915, to 30 April, 1916	Oct., ,,	2·36	3	Dec., ,,	3·73	9	Feb., ,,	0·65	3	April, ,,	0·26	2	

ANNEXURE 4.—MISCELLANEOUS STATISTICS.

	Lichtenburg.	Pietersburg.	Valuations.	
			Lichtenburg.	Pietersburg.
Draught Animals (Oxen)	79	33	£527 10 0	£264 0 0
Mules	4	4	90 0 0	55 0 0
Horses	3	Nil	90 0 0	—
Buildings erected by P.W.D. ..	4	3	1,741 0 0	1,625 0 0
Cattle Dipping Tank	1	Nil	135 0 0	—
Buildings erected by Farm Labour ..	6	Nil	875 0 0	—
Kraals	1	1	30 0 0	10 0 0
Windmills, Tanks and Tank Stands ..	2	Nil	305 0 0	—
Water Troughs	2	Nil	20 0 0	—
Implements, Machinery, Trek Gear, &c.	—	Nil	541 0 0	275 7 0
Fencing erected	20 miles	4·37 miles	855 0 0	126 0 0
Wire Netting Fences	1,800 yds.	Nil	35 0 0	—
Fencing Material on hand	—	Nil	20 0 0	—
Office Furniture	—	Nil	100 0 0	30 0 0
			£5,364 10 0	£2,385 7 0

ANNEXURE 5.—DRY-LANDS EXPERIMENT STATIONS. STATEMENT OF RECEIPTS AND EXPENDITURE FOR THE YEAR ENDED 31ST MARCH, 1916.

Receipts and Expenditure.	Lichtenburg.	Pietersburg.
(*a*) *Receipts.*	£ s. d.	£ s. d.
Sales of Seed Potatoes	40 3 6	—
,, ,, ,, Oats	25 0 0	—
,, ,, ,, Mealies	21 15 0	2 0 0
,, ,, Other Seeds and Farm Produce	122 8 7	11 6 0
,, ,, Mules	23 15 0	—
Total Actual Receipts	233 2 1	13 6 0
Transfers.		
Seed	5 13 4	28 0 0
Farm Produce	—	4 18 0
Total (*a*) Receipts .. .. .. £	238 15 5	46 4 0
(*b*) *Expenditure.*		
Administrative Charges.		
Salaries and Allowances	439 3 4	190 0 0
Transport and Travelling	47 17 4	34 0 2
General.		
Wages	568 16 6	253 10 10
Sundry Equipment	34 6 9	38 18 3
Sundry Stores..	19 16 1	21 2 2
Implements, Repairs, &c.	30 19 7	31 1 6
Seed	38 9 9	12 18 10
Manures	1 17 0	—
Railage	136 3 9	26 19 11
Incidentals	14 8 6	7 13 6
Entertainment of Visitors	9 6 9	2 9 6
Total Actual Expenditure	1,341 5 4	618 14 8
Transfers.		
Oxen	296 0 0	—
Mules	70 0 0	40 0 0
Sundry Equipment	31 2 0	38 13 0
Implements	210 0 0	40 1 0
Vehicles and Harness	38 16 0	1 10 0
Seed	47 10 0	5 13 4
Manures	120 0 0	60 0 0
Feeding Stuffs	35 8 0	—
Fencing Material	14 18 0	—
Total (*b*) Expenditure	2,204 19 4	804 12 0

APPENDIX XV.

GOVERNMENT GUANO ISLANDS

ANNUAL REPORT, 1915-16.

Considering the unfavourable conditions which had to be contended with, the guano season, 1915, may be considered fairly satisfactory and, although the total crop collected during that year shows a decrease of over 900 tons, as compared with the collections of the previous season, it was well over the average output of former years.

The Colonial Islands produced 3,079¼ tons and the Northern (Ichaboe) Group 4,141¼ tons, making a total yield, from all sources, of 7,220½ tons. A considerably larger quantity of guano might have been obtained from the latter source, had it not been for the abnormal fall of rain experienced throughout the Northern Group of islands during the month of July. In fact, the winter of 1915 was the severest on record in that locality, with the result that between 400 and 500 tons of guano were lost in consequence of the very heavy and constant downpour of rain—an occurrence which has very rarely, if ever, happened in that region before. The output from the Colonial Islands also was affected to some extent by the rains but more so by the very large mortality amongst the Penguins, due no doubt to the prevailing scarcity of small fish on the coast.

Allotment and Sale of Guano.—In accordance with the practice followed in previous years, all guano sold during the period covered by this report was disposed of by allotment. In all three allotments were made, viz.:—in March and July, 1915, and February, 1916, respectively, the first of which has already been referred to and been fully dealt with in my Report for 1914-15. In respect to this distribution, however, it may be added that, of the 50,564 bags allotted, only 49,593 bags were actually disposed of: the balance being carried over for redistribution in subsequent allotments.

In the second (July) allotment 2,000 tons were set aside for distribution, in respect to which 1,276 applications for an aggregate quantity of 34,117 bags (3,411¾ tons) were received and considered. Amongst these were several very large orders, principally from the Natal and Transvaal Provinces, but on the whole the quantities applied for by individuals, although in many instances somewhat inflated, were considerably less than on former occasions—quite two-thirds of the total applications received being for supplies of 20 bags and under, and, in view of the declarations which had been given in each case and the shortage of other fertilisers in the Union, all applications were accepted and considered as submitted.

The distribution in this allotment was accordingly carried out on the following basis, viz:—

All applications for 10 bags or less were allotted in full; applications for 11 to 60 bags were allotted two-thirds of the quantity applied for, subject to a minimum of 10 bags per applicant; and all applications for 61 bags and upwards were given one-third of the quantity applied for, with the minimum of 40 bags per applicant.

The third allotment hereinbefore referred to, which was the first for the year 1916, was made in February of that year, when 5,000 tons were again set aside for disposal. 2,464 applications for a total quantity of 191,644 bags (19,164½ tons) were accepted and considered. As quite two-thirds of these applications were for quantities of 50 bags or less, of which over 700 were for quantities not exceeding 10 bags each, it was decided to accord as much assistance as possible to the smaller applicants and the distribution was carried out on the following basis, viz:—

All applications for 10 bags or less were allotted in full; applications for 11 to 50 bags were allotted one-third of the quantity applied for, subject to a minimum of 10 bags per applicant; applications for 51 bags to 100 bags were allotted one-fourth of the quantity applied for, subject to a minimum of 17 bags per applicant; and all applications for 101 bags and upwards were given one-fifth of the quantity applied for, with a minimum of 25 bags per applicant.

The total quantity of guano apportioned under the foregoing scale was slightly over the 5,000 tons available for disposal, in respect to which 1,415 allotments, representing 3,306¾ tons were taken up and paid for by the end of March, 1916. The requirements of all Government Institutions in this and previous distributions were met in full.

The total quantity of guano disposed of by allotment during the whole of the period covered by this Report (15 months) was 10,272¾ tons.

It is quite impossible, under existing circumstances, to arrive at anything like a true estimate of what the actual requirements of applicants for guano really are, as, notwithstanding the increase in the selling price of this product last year from £5 to £7 10s. per ton, and the conditions which have been imposed in connection with its sale, the general inflation of orders and the resort by applicants to all manner of expedients, with the object of securing undue shares of the quantity offered for sale from time to time, continue just the same, and if anything are becoming worse instead of better.

The total revenue for the year amounted to £73,643 4s. 8d., exclusive of free issues, valued at £1,268 5s., and the total expenditure to £31,681 10s. 5d., exclusive of free services valued at £37 2s. 4d. The nett profit amounted to £41,961 14s. 3d.

Delivery of Guano.—Considerable unavoidable delay was occasioned at times throughout the year in connection with the delivery of the guano, in consequence of the difficulties which had to be contended with in the matter of securing vessels for bringing up the necessary supplies from the coast, the congestion at the docks and the scarcity of railway rolling stock, owing to military operations; but, notwithstanding these obstacles, the work was carried out as expeditiously and satisfactorily as could be expected under the circumstances.

Guano Production.—The prospects, in so far as the breeding season of 1915-1916 is concerned, are not too good, and the collections obtained will certainly show a further decrease as compared with the crops collected during the last three years. This is mainly attributable to the continued scarcity of small fish on the coast, which would undoubtedly appear to be caused by the very unfavourable and wet weather experienced during the latter part of last year, as a consequence of which the birds were very tardy in taking up on the islands at the proper time, thus resulting in an exceptionally late season. Up to the date of writing this Report it has not been possible to arrive at the full extent of the crop collected, but as far as this can be estimated it is not anticipated that it will be more than about 7,000 tons.

Season 1914-1915.—With the exception of Hollamsbird Island, which had been given a rest, and Penguin and Seal Islands, in Luderitzbucht, which were under Military occupation, and consequently deserted by the birds during last year, all islands and rocks were thoroughly cleansed, and the whole of the season's collections, as well as the balance of the former season's crops (475 tons shown in my previous report as still remaining on the islands on the 31st March, 1915), were brought up to Cape Town for disposal before the 31st March, 1916.

The following return shows the yield of guano and the quantities actually shipped from the various islands and rocks under my control during 1915, as compared with the previous year:—

Island.	Collected.		Shipped to Cape Town	
	1914.	1915.	1914.	1915.
	Tons.	Tons.	Tons.	Tons.
Colonial Group.				
Malagas Island	1,117½	1,053¼	672	1,498¼
Dyers ,, ...	457¾	576½	457¾	576½
Jutten ,, ...	521¼	447¾	521¼	447¾
Lambert's Bay Islet	371½	292¾	371½	292¾
Bird Island	216	233½	228	Nil
Dassen ,, ...	351¼	213½	351¼	213½
Foundlings Island	28	96¼	28	96¼
Marcus ,, ...	133¼	95¼	133¼	95¼
Elephant Rock	23¼	32¾	8¼	45¾
Paternoster	81	21¼	81	21¼
Seal Island	—	16½	—	16½
Totals	3,300¾	3,079¼	2,852¼	3,303¾
Northern Group.				
Ichaboe Island	2,603	2,555	2,971	2,805
Possession ,, ...	932¾	821¼	285	900
Halifax ,, ...	244	240	Nil	244
Mercury ,, ...	216¼	200	216¼	200
Sinclairs ,, ...	130	130	130	130
Pomona	100	100	100	Nil
Plumpudding Island	100	95	100	Nil
Penguin and Seal Island	120	Nil	Nil	120
Hollamsbird ,, ...	386¼	Nil	386¼	Nil
Totals	4,832¼	4,141¼	4,188½	4,399
Grand Totals	8,133	7,220½	7,040¾	7,702¾

The total quantity of guano (being the balance of the 1915 crop) remaining on the islands on the 31st December last was 1,237½ tons.

Demand for Guano.—The total quantity of guano applied for during the year 1915 was 160,768 bags, or 16,076¾ tons, and the total quantity disposed of in the same period was 69,723 bags (6,972¼ tons), nearly 93 per cent. of which was absorbed by the Western and South-Western Districts of the Cape Province, and of this quantity 5,876 tons were distributed between the Malmesbury, Paarl, Cape, Caledon, and Stellenbosch Divisions alone. The demand from other centres showed a falling off both as regards the number of applications received and the total quantities applied for, whilst the area of distribution also has been further restricted. This may very possibly be due to the fact that former applicants have been discouraged from applying again in consequence of the very small allotments which they had received in the past.

The following statements show the quantities of guano sold and distributed to various centres in the Union during 1915, as compared with the previous year:—

Place.	Year.		Place.	Year.	
	1914.	1915.		1914.	1915.
	Bags.	Bags.		Bags.	Bags.
Malmesbury	11,429	16,692	East London	129	15
Paarl	14,249	14,219	Riversdale	160	10
Cape	12,785	10,880	Laingsburg	60	10
Caledon	5,753	8,510	George	26	10
Stellenbosch	11.378	8,459	Graaff-Reinet	—	3
Tulbagh	1,830	2.520	Britstown	21	3
Worcester	2,624	1,773	Wodehouse	20	1
Piquetberg	1.569	1,030	Humansdorp	44	—
Swellendam	602	312	Vryburg	39	—
Ceres	464	279	Uniondale	37	—
Port Elizabeth	80	131	Transkei	15	—
Alexandria	364	93	Fort Beaufort	14	—
Knysna	125	77	Tembuland	10	—
Robertson	173	73	Prince Albert	2	—
Middelburg, Cape	20	60	Tarka	1	—
Kingwilliamstown	101	50	*Transvaal*	3,668	3,331
Stutterheim	52	33	*Natal*	1.989	828
Cathcart	40	33	*Orange Free State*	202	172
Albany	75	30			
Uitenhage	355	30	Totals Bags	70.765	69,723
Griqualand East	253	25			
Barkly West	7	16	Totals Tons	7.076½	6.972¼
Aliwal North	—	15			

SUMMARY OF DISTRIBUTION.

	1914 Tons.		1915. Tons.	
Cape Province.				
Western and South Western Districts	6,285½		6,476¾	
Other Districts	205		62½	
		6,490½		6,539¼
Transvaal.—All Districts;	366¾		333	
Natal.—All Districts	199		82¾	
Orange Free State.—All Districts	20¼		17¼	
Totals		7,076½		6,972¼

Depôts.—The guano depôt at Knysna is still being continued, through the medium of which only 77 bags (included in the foregoing statements) were disposed of during 1915, as compared with 125 bags in the previous year.

Analytical Composition of Guano.—The average analytical composition of the several stocks of guano disposed of during the year was as under:—

Nitrogen	10·47 %
Potash	1·84 %
Phosphoric Oxide Soluble in Water	3·20 %
Phosphoric Oxide Soluble in Citrate Sol.	10·42 %
Total Phosphoric Oxide	10·85 %
Lime	10·50 %

Sale of Penguin Eggs.—The revenue derived from the sale of penguin eggs collected during the season 1915 was £2,609 17s. The total number of eggs collected by the contractors being 572,040, which were taken from the following islands:—

Dassen, 418,140; Jutten, 63,360; Foundlings, 66,780, and Marcus, 23,760.

Sealing.—In view of the slump in the fur skin market in consequence of the war in Europe all sealing operations were entirely suspended throughout the year.

The 4,172 seal skins taken during the winter season, 1914, and shipped to London in November of that year, were not sold until the latter end of March, 1915, and the prices obtained were very low and most disappointing. The nett revenue derived from the sale of the whole consignment was only £2,058 14s. 1d., or an average of say, 9s. 10 2/5d. per skin.

Conclusion.—In concluding this Report I may state that I have been very much hampered throughout the year in the matter of obtaining the necessary vessels for carrying on the work of this Division, and the position is steadily becoming worse. Not only has there been a great difficulty in securing suitable steamers, but the rates for freight now demanded have increased on the colonial coast by from 25 per cent. to 50 per cent., and those to the islands on the south-west coast by about 80 per cent., above the rates previously paid for these services.

The number of small vessels plying on the coast is becoming less each year, and at the present time there are only a very few still available which can at all be employed upon the guano work, and, unless this state of affairs improves in the near future, I feel that I shall experience much difficulty in bringing up the guano from the islands in years to come. Another serious matter to consider is that of the men employed on the work of collection, etc., on the coast, as these are entirely dependent upon Cape Town for their supplies of food and water, and unless a more certain and regular means of communication with them can be maintained very grave consequences will ensue. The only way that I can see out of this difficulty would be for the Government to reconsider the question of acquiring their own steamer for the guano work, as I do not consider it safe or wise to go on as at present.

W. R. ZEEDERBERG,

Superintendent, Government Guano Islands.

ANNEXURE.—GOVERNMENT GUANO ISLANDS.

(a) CAPITAL ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 1916.

To :—	£	s.	d.
Balance 1st April, 1915, £6,508 15s. 11d.			
General Plant	665	0	3
Houses, Piers and other Structures ..	4.483	17	6
Boats	1,359	18	2
Expenditure, 1915-16, £586 6s. 11d.			
General Plant	98	5	8
Houses, Piers and other Structures ..	233	11	3
Boats	254	10	0
	£7,095	2	10

By :—	£	s.	d.
Depreciation as per Profit and Loss Account	1.033	2	4
Balance as at 31/3/16, £6.062 0s. 6d.			
General Plant	533	15	11
Houses, Piers and other Structures ..	4,345	4	9
Boats	1,182	19	10
	£7,095	2	10

(b) WORKING ACCOUNT FOR YEAR ENDED 31ST MARCH, 1916.

To :—				£	s.	d.
Stock on hand 1st April, 1916, £15,113 13s. 11d.						
Value of Guano				13,442	12	0
Value of Seed Oil				3	0	0
Value of Provisions, &c.				1,668	1	11
Administrative Charges, £4,293 17s. 11d.						
Salaries and Allowances				4,131	10	6
Transport and Travelling				162	7	5
Working Expenses, £26,801 5s. 7d.						
	£	s.	d.			
Wages	5,468	14	9			
Provisions and Water	5.077	10	4			
Material, Plant & other Supplies	1,188	6	9			
Freight	8,236	19	8			
Wagon Hire, Dock Charges, Landing and Delivery Charges, &c.	3,185	2	8			
Bags	3,530	8	9			
Collection of Guano on Smaller Islands & Rocks	469	5	5			
Miscellaneous	231	4	2			
	27,387	12	6			
Less Expenditure charged to Capital Account ..	586	6	11			
				26,801	5	7
Printing and Stationery				37	2	4
Balance to Profit and Loss Account ..				37,538	15	10
				£83,784	15	7

By :—	£	s.	d.	£	s.	d.
Receipts for year 1915-16, £71,584 10s. 7d.						
Sales of Guano	68,786	9	0			
Sales of Penguin Eggs ..	2,625	9	0			
Sales of Seal Skins in London	2,058	14	1			
Sales of Old Bagging ..	28	13	0			
Sales of Seal Oil.. ..	79	3	10			
Sealing Licences ..	5	0	0			
Royalty on Seal Skins ..	15	19	0			
Adjustment & Forfeiture of Wages	43	16	9			
	73,643	4	8			
Less value of Seal Skins shown as in transit in 1914-15 account ..	2,058	14	1			
				71,584	10	7
Value of Guano supplied as Free Issues..				1,268	5	0
Stock on hand. 31/3/16. £10,932.						
Guano				9,876	10	0
Shark Oil, &c.				3	0	0
Provisions, &c.				1,052	10	0
				£83.784	15	7

(c) PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 1915.

	£	s.	d.
Depreciation, £1,033 2s. 4d.			
General Plant 20%..	229	10	0
Houses, Piers, &c. 5%..	372	4	0
Boats 20%..	431	8	4
Balance being Net Profit for year ..	36,505	13	6
	£37,538	15	10

	£	s.	d.
Balance from Working Account ..	37,538	15	10
	£37.538	15	10

(d) BALANCE SHEET AS AT 31ST MARCH, 1916.

Liabilities.	£	s.	d.
Sundry Creditors, £2,767 14s. 5d.			
Wages	1,171	16	11
Other Accounts	1,595	17	6
Capital Account	14,226	6	1
	£16,994	0	6

Assets.	£	s.	d.
General Plant	533	15	11
Houses, Piers and other Structures ..	4,345	4	9
Boat Account	1,182	19	10
Stock Account	10,932	0	0
	£16,994	0	6

Secretary for Agriculture.

Accounting Officer.

APPENDIX XVI.

CHIEF INSPECTOR OF GRAIN.

ANNUAL REPORT, 1915-1916.

As the 1915 season was very favourable for maize growing there was, as anticipated, a considerable increase in the quantity of maize exported during the season 1915-1916, in fact this was a record export season. This is very gratifying, considering the difficulty experienced in obtaining shipping accommodation, owing to the European war, and considering also the additional quantities of grain required locally on account of the drought in the Cape Province, and in connection with military operations, etc.

Returns showing the exports of grain in full detail during the period 1st April, 1915, to 31st March, 1916, are attached hereto:—Annexure "A" shows total exports of maize through the different ports, and the several destinations. Annexure "B" shows the different grades of maize exported and the Province of origin. Annexure "C" shows rejected maize and the causes of rejection. Annexure "D" shows the various kinds of grain, in addition to maize, exported from the Union, the ports through which exported and the destinations.

From the above returns it will be observed that during the twelve months ended 31st March, 1916, 2,123,383 bags of maize, 32,358 bags of oats, 3,779 bags of chop, 50 bags of lucerne seed, 5,284 bags of mealie meal, 229 bags of millet, 3,066 bags of barley, and 85,466 bags of Kaffir corn were exported, as against 1,156,247 bags of maize, 86,289 bags of oats, 3,740 bags of chop, 302 bags of crushed mealies, and 3,550 bags of barley, for the twelve months ended 31st March, 1915.

Quality of Maize.—The quality of maize exported during the season appears to have been even better than that exported during the previous season; very little was rejected on account of unsoundness. 8,340 bags of maize were rejected on the score of weevils, but these were presumably some of the previous season's crop; 4,385 bags for being musty, and about 21,200 on account of dampness; the latter being forwarded during the beginning of the season, and before the maize was sufficiently dry for shipment.

Bags.—It was again found necessary to rebag a large quantity (about 64,000 bags) of maize at the ports of shipment, owing to the bags being unfit for export, and not conforming with the export regulations.

Grading.—No complaints have been received during the past season in connection with the grading of grain for export by our graders, and it would appear, therefore, that the grading is being carried out to the satisfaction of all parties interested in the export trade.

Standard Samples.—Maize and Kaffir corn samples were again made up last year in accordance with the existing export grades fixed by Government Notice 1417 of 1914, and a large number of such samples have been disposed of during the season to shippers of maize, firms and local bodies throughout the Union.

Oats.—It will be observed that there has been a decrease of about 54,000 bags in the exportation of oats, as compared with the exports of 1914-1915. This is doubtless due to the additional large quantities consumed in the Union for military purposes.

Barley.—Approximately 3,000 bags have been exported to the United Kingdom during the season, as compared with 3,500 bags in the previous season.

Kaffir Corn.—From Annexure "E" it will be seen that 85,466 bags of this grain were exported during the season; this is the first time that an appreciable quantity of Kaffir corn has been exported from the Union, and it seems, therefore, that an oversea market has been established for this kind of grain. Of the quantity exported 85,200 bags went to the United Kingdom.

Lucerne Seed.—50 bags of lucerne seed were exported during the period under review, and went to Australia. This is the first shipment of lucerne seed from the Union.

Annual Maize Conference.—The 1915 Conference was held at Cape Town on the 16th April, 1915, and was attended by representatives of the Associated Chambers of Commerce of South Africa, the Agricultural Unions, the Central Agency for Co-operative Societies, the Union Castle Steamship Company and Conference Lines, and the South African Railways, and I append hereto a summary of the resolutions adopted thereat, detailing the action taken and the decisions arrived at thereon:—

(i) "That this Conference wishes to impress upon the Government the absolute "necessity for the collection of accurate statistics as regards grain production."

Steps have been taken by the Department for the collection of crop reports, including grain, and returns showing the particulars of the different crops have been regularly published as a Press circular since September, 1915, and also forwarded to agricultural bodies.

(ii) "That the penalties for consigning export maize in bags exceeding regulation "weight should be charged only on the overweight—on the understanding that the present "rates of penalty should under such arrangement be increased."

The Railway Administration advises that "it has now been agreed to charge double ordinary rates on all maize received in excess of the weight laid down for export traffic, *viz.*, 203 lbs."

(iii) "That this Conference desires to express its appreciation of the action of the "Government in facilitating the shipping of maize under the difficult conditions which have "recently arisen regarding freight."

(iv) "That in view of the very large crop of maize expected to be reaped shortly the "Conference urges that the Agricultural Department should use every endeavour to see that "freight is provided for the export of maize, and that the Railway Department should "provide sufficient rolling stock and tarpaulins to cope with the traffic."

Every endeavour is being made by the Railway Administration to cope as expeditiously as possible with this traffic. The Administration has had to contend with many difficulties owing to its inability to obtain supplies of the articles mentioned from oversea.

(v) "That in view of the statement made by the representative of the Shipping Com-"pany, that in all likelihood freight would go up, and the shortage of tonnage which they "were able to provide at the ordinary rates, the Government be urged to go closely into "the matter as to any possibility of obtaining reasonable rates of freight for the export of "maize."

The Government has done all in its power to maintain a low rate of freight, but owing to war conditions the rates have increased all over the world.

(vi) "That the Railway Administration should accept responsibility for damage done "by rain to export maize while in transit on the railways, and while awaiting shipment at "the ports."

The Railway Administration states that in cases where damage has been sustained during rail transit as the result of gross or wilful negligence on the part of the Administration or its servants, responsibility for such damage is accepted. They point out, however, that the consignors have the option of consigning this traffic at railway risk, *viz.*:—Clause 227 of the Tariff Book.

(vii) "That all grain forwarded to the ports for export and which is shipped should "be allowed the benefit of the Railway export rate."

The Railway Administration advises that the terms of this resolution, covering too wide a field, cannot be agreed to. Each case is, however, dealt with on its merits, provided that consignors have taken care to see that the regulations covering export traffic have been observed.

(viii) "That the South African Railways be urged to accept responsibility for numerical "shortages from all stations without extra charge."

The Railway Administration is not prepared to agree to this resolution. Practical experience indicates that there is no real need for the Administration to accept responsibility for numerical shortages. At the present time facilities are provided for such acceptance at the cost of 1d. per bag, but rarely has advantage been taken of these facilities.

(ix) "That all Railway regulations connected with the export of maize should appear "in the Railway Tariff Book."

The Railway Administration does not see its way to agree to this, as it would mean adding several pages to the Tariff Book; and the regulations connected with the industry are obtainable at any station.

(x) "That a strong recommendation should be made to the Railway Department for "the duplicate and triplicate copies of receipts to be distinctly marked to this effect, it "being possible otherwise for the duplicate and triplicate receipts, being negotiable docu-"ments, to be utilised, and for consignments placed upon the rail to be paid for more "than once by those parties to whom they are consigned."

While it is not usual for the Administration to grant duplicate receipts, an exception has been made in the case of export and local traffic; and instructions have been issued to the staff that where consignment notes for export are handed in in triplicate the original copy must be retained, and the second and third copies distinctly marked duplicate and triplicate respectively by consignor; otherwise the Department will not issue them.

(xi) "That weighing facilities be furnished by the S.A. Railway management at all "the principal stations to which maize is consigned."

Clause 219 B of the Tariff Book provides that senders are responsible for declaring the actual weight on the consignment note, and in order to complete the contract between the Administration and the public for the conveyance of this traffic it is essential that the actual weight be declared.

The Administration will, where weighing facilities exist, and it is convenient to do so, weigh goods at the special request of either the consignor or consignee, but special arrangements will have to be made beforehand.

(xii) "That the standard grades of maize be fixed on the existing basis, and that no "alteration be sanctioned unless it be found necessary from time to time to create new "grades to meet demands."

The Department is at one with this resolution, and there is no intention of altering the existing standards.

(xiii) "That the Trades Commissioner in London be asked to urge the more extensive "use of maize in England by pointing out the many purposes for which maize is used in "America."

The Department has been in correspondence with the Trades Commissioner in the matter. That official has asked that samples of the products may be furnished, and steps are being taken with a view to meeting his request.

(xiv) "That in view of the test made in connection with wet maize, this Conference "urges that the maximum moisture content of 12½ per cent. be maintained."

This resolution is agreed to.

Staff.—No changes have taken place in the staff of the Division during the period under notice, except that as the result of representations made to the Railway Administration for facilities to export grain through Mossel Bay, the Administration asked the Department to provide a grader at this port; a grader was consequently appointed there in October last, on the same terms on which the graders at East London and Port Elizabeth are employed, *i.e.*, a monthly retaining fee, and, in addition, a fixed fee of 4d. per ton, for all grain graded by him. As no grain was, however, exported through this port, and as there is now very little likelihood of any grain being shipped through this port, the grader's services have been dispensed with.

The Chief Inspector of Grain is still seconded to the Defence Department.

General.—The expenditure in connection with this Division for the financial year 1915-1916 was £2,731 6s. 10d., and the revenue for the same period £5,057 2s. 1d. Since taking over the work from the Railway Administration in April, 1911, the receipts and expenditure were, respectively, £12,781 and £14,707.

From all accounts the 1916 maize crop will be a poor one, due, in the first place, to drought during the critical time of the year, and, secondly, to early frosts which nipped the late mealies. It is anticipated that there will be sufficient maize for local consumption, but very little, if any, for export this season.

The writer visited all four ports in August, 1915, and found evertything in order in the offices of the different graders. He also called upon the principal shippers of grain at the ports, and all such shippers expressed themselves highly satisfied with the grading, etc. None of the shippers had any complaints to make regarding the grading of grain for export.

In conclusion, I wish again to tender my thanks to the officials of the Department of Railways and Harbours for the ready assistance rendered at all times to the officers of this Division in the performance of their duties.

MELT VAN NIEKERK,

for Chief Inspector of Grain.

ANNEXURE A.—MAIZE EXPORT, SHOWING THE PORTS THROUGH WHICH EXPORTED AND DESTINATIONS, FOR THE YEAR ENDED 31ST MARCH, 1916.

Through	Cape Town.	Durban.	Port Elizabeth.	East London.	Total.
	Bags.	Bags.	Bags.	Bags.	Bags.
To United Kingdom	267,852	1,140,504	9,125	66,864	1,484,345
,, Australia	291,044	341,146	—	—	632,190
,, New Zealand	6,143	—	—	—	6,143
,, St. Helena	150	—	—	—	150
,, Angra Pequena	30	—	—	—	30
,, S.W. Protectorate ..	350	—	—	—	350
,, Walvis Bay	175	—	—	—	175
Totals	565,744	1,481,650	9,125	66,864	2,123,383

ANNEXURE B, SHOWING THE DIFFERENT GRADES OF MAIZE EXPORTED AND THE PROVINCES OF ORIGIN, FOR THE YEAR ENDED 31ST MARCH, 1916.

Grades.	Transvaal.	O.F.S.	Natal.	Cape Province.	Basutoland.	Total.
	Bags.	Bags.	Bags.	Bags.	Bags.	Bags.
F. W. 1	8,566	4,157	13,169	—	—	25,892
F. W. 2	910,695	405,120	76,025	—	—	1,391,840
F. W. 3	14,012	18,074	177	—	—	32,263
F. Y. 4	68,204	81,865	6,167	—	—	156,236
R. W. 5	3,129	34,105	241	—	—	37,475
R. Y. 6	34,633	367,324	8,541	—	16	410,514
F. M. 7	631	2,839	966	—	2,812	7,248
R. M. 8	1,501	45,724	2,498	—	5,536	55,259
B. G. 9	1,724	4,695	—	—	9	6,428
Weevily	—	—	—	—	—	—
Wet	1	227	—	—	—	228
Totals ..	1,043,096	964,130	107,784	—	8,373	2,123,383

ANNEXURE C.—MAIZE EXPORTED, SHOWING THE MAIZE REJECTED DURING THE YEAR ENDED 31ST MARCH, 1916.

Cause of Rejection.	Cape Town.	Durban.	Port Elizabeth.	East London.
	Bags.	Bags.	Bags.	Bags.
Weevily	6,097	1,742	—	501
Musty	3,439	943	—	3
Wet	3,020	18,218	3	9
Other causes	1,020	—	6	—
Totals	13,576	20,903	9	513
Rebagged owing to bad bags ..	26,215	—	—	2,128

ANNEXURE D.—VARIOUS KINDS OF GRAIN (EXCLUDING MAIZE) EXPORTED FROM THE S.A. UNION AND THE DESTINATIONS, DURING THE YEAR ENDED 31ST MARCH, 1916.

Shipped from	Cape Town.	Durban.	Port Elizabeth.	East London.	Totals.
	Bags.	Bags.	Bags.	Bags.	Bags.
Oats	32,358	—	—	—	32,358
Chop	3,779	—	—	—	3,779
Lucerne seed ..	—	—	50	—	50
Mealie Meal ..	5,284	—	—	—	5,284
Millet	—	229	—	—	229
Barley	—	—	3,066	—	3,066
Kaffir Corn ..	13,273	67,013	—	5,180	85,466

Shipped to	United Kingdom.	Australia.	Walvis Bay.	S.W. Protect.	Mauritius.	Portuguese W. Africa.	Totals.
	Bags.	Bags.	Bags.	Bags.	Bags.	Bags.	Bags.
Oats	4,788	—	—	250	27,320	—	32,358
Chop	3,779	—	—	—	—	—	3,779
Lucerne seed ..	—	50	—	—	—	—	50
Mealie Meal ..	1,867	—	930	—	—	2,487	5 284
Millett	229	—	—	—	—	—	229
Barley	3,066	—	—	—	—	—	3,066
Kaffir Corn ..	85,211	—	255	—	—	—	85,466

APPENDIX XVII.

REGISTRAR OF BRANDS AND CONTROLLER OF FENCING.

ANNUAL REPORT, 1915-1916.

During the period 1st April, 1915, to 31st March, 1916, 306 brands were registered in the Transvaal, 110 in the Cape Province, and 18 in the Orange Free State. 458 branding irons were supplied. £139 10s. was collected for registration fees, and £283 16s. 9d. for branding irons supplied at cost price.

Brands Directories.—The Transvaal 11th Edition of the Annual Brands Directory was prepared and published in accordance with the requirements of the Brands Ordinance, 1904. Quarterly returns of brands issued from time to time were prepared and published regularly; the 12th Edition of the Annual Directory was also prepared early in the year, and has been duly published.

Quarterly returns of the brands registered in the Cape were prepared and published regularly. The Orange Free State quarterly returns were prepared and published regularly; the 1914 and 1915 editions of the Orange Free State Brands Directory have been prepared and published.

The total number of brands registered in each Province to the 31st March, 1916, is as follows:—

Transvaal	19,377	
Orange Free State	1,486	
Cape	5,472	
Total		26,335

Fencing.—144 applications have been dealt with under Act No. 17 of 1912 during the period under review, and contributions towards the cost of dividing fences were declared obligatory in the ward Upper Schoonspruit, Potchefstroom District, and ward Zwartruggens, Rustenburg District.

Under Section *nine* of the Act, 5 farms in the Transvaal and 17 in Natal were ordered to be fenced for the purpose of preventing the spread of stock disease.

Dipping Tanks.—138 applications for advances under the provisions of the Dipping Tanks Advances Act, No. 20 of 1911, were dealt with during the year.

Staff.—Mr. J. E. Meyer was seconded for service in the Defence Department in August, 1914, and he is still with that Department; and Mr. Nussey, the Registrar of Brands, has been lent to the Department mentioned since the 11th January, 1916.

MELT VAN NIEKERK,

for Registrar of Brands and Controller of Fencing.

APPENDIX XVIII.

DECIDUOUS FRUIT EXPORT TRADE.

Review of the Deciduous Fruit Export Trade for the Season ending May 1916 by the Trades Commissioner.

It is satisfactory in reviewing the past season's shipments to find that notwithstanding the abnormal difficulties which have arisen, the export of fruit increased by approximately 45,000 boxes, as compared with the previous year.

The following figures will show the quantity of each class of deciduous fruit exported during the seasons 1914, 1915, and 1916:—

	1914.	1915.	1916.
Apricots	3,580	1,280	1,803
Peaches	56,830	26,193	42,869
Pineapples	5,442	1,304	95
Nectarines	8,977	6,062	7,532
Plums	83,639	30,910	27,130
Pears	164,966	56,722	94,951
Grapes	125,412	77,892	71,331
Mangoes	327	663	356
Apples	184	426	9
Melons	3,530	775	881
Sundries	178	65	459
Totals	453,065	202,292	247,416

The shortfall for the last two years is due entirely to the want of space in the cool chambers of the ships.

Growers will, I feel sure, readily appreciate the extreme difficulties which had to be overcome, not only on this side, but at the port of shipment.

The delays in discharging the fruit at the East India or Tilbury Docks have on more than one occasion caused me considerable alarm, but I am convinced that both the Union Castle Company and the Port of London Authority, did everything possible to facilitate the despatch of the fruit to Covent Garden.

Condition.—The fruit shipped during the past season was of high quality. Great progress had been made in the grading and packing of the fruit, and the condition on arrival here left little to complain of. During the past two seasons, however, the extended period of transportation was the cause of a fair amount of wastage. If the time from the date of shipment to the date of discharge was 21 days, before the war, then the average period since the war was 30 days.

Markets and Prices.—Since the War abnormal conditions have prevailed on these markets—for instance, Belgian hot house grapes have, of course, not come forward, which removed the principal competition in that line of fruit, and was the cause of the high prices made for South African grapes. On the other hand there was no inclination on the part of the public to pay "fancy" prices for fruit, such as peaches, plums, nectarines, particularly so as no banquets or society functions are taking place at present. Then again the Continental markets have been closed against us.

It is surprising that under these adverse circumstances the past season's fruit realised such satisfactory prices, and, on the whole, shippers should be satisfied with their returns, although they would, no doubt, have been much better off had they been able to ship all the fruit they produced which was fit for export.

Apricots.—During the past season 1,803 packages were received, as compared with 1,280 the previous year. The condition of the fruit throughout the season was, with few exceptions, very good, whilst the size and colour called for no adverse comment.

At the commencement of the season prices ranged from 6s. to 7s. per box for the larger sized fruits, counts of 35's to 40's, but as the season advanced prices varied from 2s. 6d. to 5s., counts of 35's to 54's.

Peaches.—42,869 boxes of peaches reached the London market as compared with 26,193 in 1915.

The first two or three shipments were in excellent condition, but later on the fruit showed much waste. When it was first opened, it was to all appearances quite sound, but within a short time the fruit commenced to "break down," showing that it had been too long in cold storage.

The "Early Alexanders" and "Duke of Yorks" seemed to have suffered the most. Other varieties such as "Old Cape," "Peregrine," and "Gladstone" were in better condition, but later on in the season even these were inclined to be wasty.

[T.G. 25—'17.]

The following are the approximate average prices for the different varieties per box. Counts 15's to 35's:—

"Early Alexander"	4/- to 8/-	and up to 12/-
"Duke of York"	3/6 to 6/-	,, ,, 10/-
"Old Cape"	4/- to 5/-	,, ,, 10/-
"Royal George"	3/6 to 6/-	,, ,, 8/-
"Peregrine"	4/- to 6/-	,, ,, 8/-
"Gladstone"	4/- to 5/-	,, ,, 8/-
"Sea Eagles"	3/- to 5/-	,, ,, 8/-
"Early Rivers"	2/- to 2/6	Very few of these varieties were received.
"Elbertas"	2/- to 3/-	

Plums.—The total quantity of plums received amounted to 27,130 boxes as compared with 30,910 boxes the previous season.

The condition of the fruit on the whole was quite satisfactory, with the exception of some of the "Apple" and "Chalcot" varieties, which in the later shipments arrived in a rather advanced stage of ripeness.

This season's prices compared favourably with those of the previous year.

The first variety to arrive was the "Methley" from the Natal Province, which averaged from 3s. to 6s. a box, counts of 54's to 96's. The "Wicksons" and "Santa Rosa" at the commencement of the season made from 5s. to 6s. a box, various counts, and during the latter part from 3s. to 4s. 6d.

The following were the average prices ruling for the different varieties:—

"Methley"	3/- to 6/-	per box, various counts.
"Wickson"	3/- to 4/6	,, ,,
"Santa Rosa"	3/- to 6/-	,, ,,
"Pride of England"	3/- to 3/6	,, ,,
"Sultan"	4/- to 5/-	,, ,,
"Chalcots"	1/6 to 5/-	,, ,,
"Apple"	5/- to 10/-	,, ,,
"Kelseys"	4/- to 8/-	,, ,,

Nectarines.—This season 7,532 boxes reached the market as against 6,062 the year before. The condition of the fruit was quite satisfactory, but in some instances the quality was rather poor, there being far too many undersized fruit.

I am, however, convinced that nectarines will always meet with a good demand in normal times, as it carries remarkably well, and is an attractive fruit.

Prices throughout the season have been slightly lower than in previous years. The first arrivals of "Early Rivers" made from 5s. to 8s. a box, counts of 21's to 24's, and from 4s. to 5s. for counts of 24's to 32's. "Gold Mines" averaged from 5s. to 8s., and up to 10s. per box for the larger sized fruit. "Stanwyks," 5s. to 6s., "Newtons," 5s. to 6s., and "De Cousa," 6s. to 8s.

Pears.—94,951 boxes were received as compared with 56,722 the previous year, showing an increase of 38,229 boxes. This fruit arrived in very good condition, and the standard of quality was well maintained, in fact the size of the fruit has never been finer. There were, however, one or two marks during the season, these included principally "Bon Chretien" and "Clapps Favourite," which arrived in a more or less overripe condition, but this, I am of opinion, was due to the delay in transportation.

Prices throughout the season have been very well maintained, and compare favourably with those ruling during 1915. The average prices per box, various counts, were:—

"Doyenne de Comice"	8/- to 12/-	and up to 15/-
"Clapps Favourite"	4/- to 5/-	
"Bon Chretien"	3/- to 6/-	
"Beurre Hardy"	4/- to 5/-	and up to 6/6
"Winter Nellis"	4/- to 6/-	
"Glout Morceau"	4/- to 6/6	
"Josephine"	5/- to 6/-	

Grapes.—The total quantity of grapes received amounted to 71,331 boxes, as compared with 77,892 during 1915.

On the whole the grapes arrived here in very good condition, with the exception perhaps of the last two or three shipments, which showed a considerable amount of wastage.

The quality and packing of the grapes showed considerable improvement, and it is evident that growers have exercised greater care in the growing and preparing of their grapes for these markets. Occasionally some remarkably fine specimens of well grown South African grapes were shown to me, which received high praise from the salesmen at Covent Garden.

The demand for grapes of all descriptions was extremely good; as the market was practically devoid of other supplies, South African grapes secured exceptionally good prices. Towards the end of the season, however, prices declined owing to the poor condition of the fruit.

The following are the average prices for sound grapes for the past season per 10 lb. box:—

"Hermitage"	7/- to 12/-
"White Hanepoot"	7/- to 12/-
"Red Hanepoot"	7/- to 15/- up to 20/-
"Gros Colman"	8/- to 12/- up to 24/-
"Waltham Cross"	9/- to 12/- up to 15/-
"Lady Downe Seedling"	8/- to 14/- up to 18/-
"Barbarossa"	8/- to 15/-
"Flaming Tokai"	6/- to 14/-
"Raisin Blanc"	6/- to 10/- up to 12/-

NOTE.—Wasty boxes of all varieties were sold at lower prices.

Experimental Shipments.—What I consider to be the most important experiments ever made in regard to the fruit trade were those made by Dr. Perold—the Government Viticulturist, who made several shipments, including many varieties of new types of table grapes grown at the Government Experiment Station at the Paarl. Great care was taken in the details of the shipments, and the results were most satisfactory.

I personally inspected every consignment very carefully, always in company with Covent Garden dealers, and I hope the experiments will be continued next year.

Although it is rather too early for me now to make a definite statement which will guide growers of grapes to select the varieties of vines for future planting, I may now give it as my opinion that amongst these new types (that is, new to South Africa), there were some varieties which showed remarkable keeping and carrying qualities, and were of attractive appearance and good flavour. It is more than probable that some of these varieties will be found more suitable for these markets than others of our older types of grapes.

The following is my report on the different varieties contained in the experimental shipments:—

Frankenthal.—Reached here on the 8th March. An attractive black grape which arrived in very good condition, the berries clung on fairly well to the stalks, although the fruit was rather soft. It is very similar to the English hothouse "Black Hambro." The flavour was fairly good, and the opinion of the dealers quite favourable.

Only one box was included in the experiments, and this realised 6s. (10 lbs.)

Grossa Vivarais.—An early white grape, arrived on the 8th March. Its appearance was not at all attractive and the grape did not carry well. The berries were not large enough and also inclined to drop rather readily. The flavour, however, was good.

I do not consider from the sample that this variety will meet with much success on these markets.

The sample box reached 6s.

Black Manukka.—This was one of the first of the experimental grapes to reach the market at the end of February. It is a dark grape with long shaped berries and loose bunches. This type of grape is already known on the market and a similar variety called "Purple Cornichon" is frequently shipped from West Australia, but it is not liked by the trade. The sample in question arrived in poor condition and I recommend that it should not be shipped.

Prices ranged from 2s. 6d. to 6s. per box.

Gros Maroc.—A very fine dark red grape, which is already known on these markets. It has very nice sized berries which cling on well to the stalk. Both shipments arrived in good condition. The flavour is good. This variety appears to be a good traveller and is well liked by the dealers. I think it will be a very marketable grape. It made from 10s. to 12s. a box.

Muscat Madresfield Court.—An early variety arrived here about the beginning of March. It is a very nice looking black grape with fine sized berries. Each shipment arrived in a rather withered condition and a few berries dropped off. On the whole, however, its appearance was not at all unsightly and I consider that it carries fairly well. The flavour is quite good. I may state that this variety is well known on the market and it is considered that shipments should be encouraged. The samples realised from 9s. to 12s. 6d. per box.

Black Spanish.—This is a very good black grape, but it arrived in a slightly soft and flabby condition; the berries, however, clung on well, and were of good size. The flavour was fairly good. It is not as fine a grape as the "Gros Maroc," but if it grows well and crops well in South Africa, then its export might be encouraged after further experiments have been made; otherwise it is very similar to "Black Hambro," "Frankenthal" and "Gros Maroc." Secured 12s. a box.

Bonnet de Retord.—A black grape of attractive appearance. The berries are somewhat small but are striped. In some cases the bunches were rather too large. It arrived in good condition and the berries clung on well. Flavour quite good. It is a saleable grape but no better than the "Hermitage" and buyers do not consider that its fancy marking will help its sale. The sample boxes realised from 8s. to 10s.

Purple Cornichon.—A long shaped dark coloured berry, in regard to which experiments have often been made by West Australia. It is not a favourite on the market. The condition of this particular sample on arrival was fairly good and the berries clung on well, but the flavour was poor. The same remarks apply to this grape as to the "Black Manukka." The price realised was 8s. a box.

Molinera Gorda. Samples of this variety of grape arrived in the first shipment at the end of February and were also included in several subsequent consignments extending over a period of nearly two months. It is a dark red grape with good sized berries and of good flavour. It arrived in excellent condition and apparently is a marvellous keeping grape. The berries cling on exceptionally well, and I might almost say that not more than one berry in five bunches dropped off during the inspection. One box was placed in my office show window for 13 days, after taking seven days in coming from the ship, making a total of 20 days in all. I carefully examined the grapes afterwards and there was hardly a berry affected in the whole box. I think this variety will prove an excellent one for export, and dealers here are much impressed with it.

I am not sure whether this grape will replace our "Red Hanepoot" which is far the most profitable grape for shipment. The Molinera Gorda, however, arrives earlier and is a better keeping grape.

The different shipments made 9s., 10s., 10s., and 13s. per box.

Diovazani.—A grape with medium sized berries, arrived in fairly good condition. The berries clung on well to the stalks. On the whole it seems to carry very well, whilst the flavour is good. Dealers were quite impressed with it. The sample boxes made 12s. each.

Olivette Barthelet.—Rather a nice looking white grape with fairly good sized berries and seems to travel better than the "Raisin Blanc," and is of firmer flesh, while the berries cling on well to the stalks. This grape made a good impression on the trade. I had a box of this variety of grape in my office show window for 13 days and they were still in good condition at the end of that time. It is possible that this grape will, after further experiments, prove a suitable one for export.

The sample boxes realised from 8s. to 12s. each.

Servan Blanc.—Rather a nice looking white grape, much after the style of "Raisin Blanc," but will probably carry much better. Of all the bunches I inspected not a single berry dropped off; it is also firm-fleshed and seems to be a hardy variety. The trade was rather well impressed with its condition on arrival.

I think this grape will prove very suitable for export, but more experiments must be made.

Prices ranged from 10s. to 12s. a box.

Dattier de Beyrouth.—A very fine looking white grape, good sized berries which cling on fairly well to the stalks. The flavour is good. It appears to be a hardy traveller and firm-fleshed. Dealers thought well of it. After 13 days in my office show window it was still perfectly sound. This should prove a good variety for export. The sample made 14s. a box.

Rosaki di Smyrna.—A grape resembling "Dattier de Beyrouth" and the remarks made upon the former will also apply to this variety, except that the stalks of the "Rosaki di Smyrna" wither very much and break off.

The first experimental box in the "Saxon" consignment arrived in sound condition, but 20 to 30 per cent. of the berries dropped off, whilst in the following shipments this defect was less noticeable. Anyhow, I fear that this variety will not prove successful for export. More experiments might be tried.

The samples realised 11s. a box.

Malakoff Isjum.—A black variety with rather loose bunches and many of them rather too small. This berry is also too oblong to be much liked on this market, whilst it is too similar in appearance to the "Cornichon" against which there is a prejudice. Dealers said that the flavour was not distinctive enough to make it attractive to this market. It arrived in a very good condition and the berries held on fairly well.

Unless it has other good points in growing or cropping, I do not see much advantage in this type of grape.

It secured 10s. a box.

Formosa.—Another good white grape of fair size, which arrived in good condition. Dealers thought rather well of it, and consider the flavour was good. The berries cling on well. Further experiments should be made.

10s. a box was secured for the sample boxes.

Barlinka.—This is an extremely nice black grape and arrived in very good condition. The berries clung on well, whilst the flavour was quite good. The colour was more regular than the "Henat Turki." This will probably prove to be a very saleable variety.

It made 10s. to 12s. a box.

Rosada.—A pink grape with a very distinctive colour, although not very large, the berries are hard and firm and cling on well to the stalk. This variety arrived in fairly good condition. The flavour of this grape is very sweet, and dealers think it will possibly take on here when it becomes better known.

Secured 10s. a box.

Prune de Cazouls.—Very fine looking black grape, with large berries. The first sample did not carry very well, the berries being soft and flabby, but the second lot was in rather better condition. I am of opinipn that this variety may yet prove suitable for export, but further experiments may be made.

This grape made 10s. a box.

Henat Turki.—A very fine looking grape, large berries and well shaped bunches, whilst berries cling on well, and flesh firm, the flavour is also good. Dealers thought very well of this variety, and along with the "Molinera Gorda" is one of the best out of the whole experiments. It should prove a very fine export grape, but further experiments should be made.

These made from 10s. to 14s. a box.

Karroo Belle.—Unfortunately the condition of this grape on arrival was poor—some being wet and showing signs of mould. It is, however, a nice dark red grape of good appearance, but the bunches are rather small. The flavour is good. Further experiments should be made next season. This variety realised 10s. a box.

Tribodo Nero.—A white grape of fine appearance, the berries cling on well to the stalks, and the bunches are of fair size, but the flavour is rather poor. Further experiments might be made.

7 boxes of this variety secured 8s. each.

Before growers secure vines for export grapes from amongst the varieties which I have reported upon in the foregoing, they should consult Dr. Perold as regards the bearing capabilities of some of the types, also as to whether they are early or late varieties and other conditions appertaining to the growing and production side of the question.

Samples of some of the varieties included in the experiments were grown on trellises. There was not much difference between these and the samples grown in the ordinary manner. The trellis grapes were, however, a little cleaner and if anything slightly better in condition, but it is difficult to make a definite statement on the result of only a few sample boxes.

Prices.—Although I quoted the prices which the sample boxes made in each variety, I do not consider that these give an indication of the quality or appreciation of the dealers. In most cases the whole consignment was bought by one dealer, some of them more as a curiosity than otherwise. A true indication of the price of each type can only be ascertained when they are offered on the market in commercial quantities and when they become better known.

Almeria Grapes. 40 cases of Almeria grapes were received from the Government Experimental Station at the Paarl and placed on Covent Garden market on the 10th May, 1916.

This consignment of grapes was carried between decks, in what is usually called "Ventilated Hold," after having been held over at Cape Town for about three weeks before shipment.

The portion of the shipment marked "A C" had a fair percentage of wasty berries. The portion which had no distinguishing mark was in quite good condition, hardly a bad berry to be found.

The flavour of the fruit was good. Berries were rather undersized and in some cases the fruit was rather green. Unlike the other types of grapes exported from South Africa, the market desires Almeria grapes to have a rather bright amber colour.

The grapes in this consignment were packed by the same method as the other grapes, that is, with paper and in 10 lb. boxes, instead of cork dust, as is customary with Almeria grapes.

The price realised on an average was 6s. per box for the whole consignment. In some cases 8s. was made, but the wasty portion brought down the average. Buyers are of opinion that there is a good demand for this type of grape during the months of May and June.

Considering the difficulties under which this shipment was made, I do consider that the grapes arrived in a very good condition. Under normal conditions, and with the proper method of packing these grapes will arrive here in a very good marketable condition.

West Australia has long ago entered the market for Almeria grapes. There were several consignments received during this season, which realised an average of about 16s. 6d. per box of about 32 lbs. packed in cork dust.

Pineapples.—Only 95 cases were received during the season as compared with 1,304 the previous season. These realised about 4s. 6d. a case of 12 fruits.

The market for this class of fruit has been very poor indeed, and it is just as well that only a small quantity was sent from the Union. Large quantities of Azores pines reached the market as compared with normal years, and ridiculously low prices were obtained. Prior to the War the greater portion of the Azores shipments went to Hamburg.

Mangoes.—356 boxes and trays of mangoes were shipped during the past season as compared with 663 during 1915. Those from the Barberton District carried very well, and made from 8s. to 10s. a box, various counts. A few trays from the Natal Province arrived in rather a poor condition.

The demand for Mangoes on these markets is always limited.

C. DU P. CHIAPPINI,

Trades Commissioner, Union of South Africa, London.

APPENDIX XIX.

SOUTH AFRICAN CITRUS FRUIT SHIPMENTS, SEASON, 1915.

REPORT BY THE ACTING TRADES COMMISSIONER IN LONDON.

SUMMARY.

The first shipment of South African Citrus fruit reached London on the 16th June, and the season practically closed about the middle of November, although parcels of small size have continued to arrive up to the present time.

The main shipments were made up as follows, the 1914 figures being placed alongside for purposes of comparison:—

		Season 1915.	Season 1914.
Oranges	Cases	38,681	43,565
Naartjes	Trays and Boxes	14,692	25,370
Pineapples	Cases	349	3,446
Lemons	,,	1,054	20
Grape Fruit	,,	246	—
Sundries	,,	—	12
		55,022	72,413

From the above figures it will be seen that there was a decrease of 17,391 packages during the season under review, the only increase being in respect of Lemons.

ORANGES.

The condition on arrival of this season's fruit has not been entirely satisfactory, the percentage of waste having been much too high. Here and there one may find a salesman who is apparently satisfied with the results, who considers that his deliveries were in no sense inferior to those of last year, and that no more repacking or no larger percentage of waste was evident this year than last season. This may not improbably have been the experience in certain isolated cases, but the general opinion in regard to at least two-thirds of the fruit arriving here during the last few months, is that we must go back at least four or five years before we find a parallel to the degree of waste which has been encountered this season.

The origin of the mischief will, perhaps, best be understood by the growers themselves. The factors contributing to a successful fruit export trade are so numerous that to attribute the waste to one particular cause would perhaps be unfair, but I think it will not be seriously disputed—at any rate it is not on this side that the abnormal conditions as regards shipping arrangements are largely responsible for what has happened.

Apart from all question of waste, it is an axiom on Covent Garden market that oranges carried in ordinary stowage are not worth as much by 2s. a case as those brought over in Cold Storage. The marketable qualities of the fruit are diminished, and it loses much of its brightness and firmness, which means so much to the retailer.

I take it, however, that there is no question as to the superiority of cold storage over all other forms of carriage for citrus fruit, and that shippers during the past season have only assented to their fruit being carried in ventilated hold and on deck, because of what appeared an unavoidable necessity. Here, therefore, I propose to leave the subject.

It is, however, only right that I should state that the Mail Steamship Company, as well as the Dock Authorities did everything in their power to expedite as much as possible the delivery of the fruit on its arrival in London. On several occasions the steamer was brought into the dock for the sole purpose of unloading the fruit, thereafter returning to the river to await her turn at the wharf for the purpose of discharging her general cargo.

I should also like to add that notwithstanding the unavoidable delays which have at times occurred in the delivery of shipments on this side, it is the opinion of most salesmen that there has been a much better delivery of South African fruit from the mail boats than a good deal of fruit from other sources, and that the trade is at present experiencing delays and difficulties which certainly did not occur when the bulk of our fruit was coming in.

Condition. Cape Province.—In so far as Oranges from the various districts of the Cape Province are concerned, the condition of the fruit on arrival at the commencement of the season was very good, but later on as the season advanced, the percentage of waste was, at times, considerable. One mark from the Clanwilliam district, throughout the season, opened up very wasty and one or two others from the same district also suffered to some extent.

The Navel Oranges from the Cape Province call for little if any adverse comment. Some really fine fruit, clean skinned and of good size, was received, but here and there coarser fruit was noticeable. The bulk, however, was quite irreproachable.

Natal Province.—The Seedling Oranges from the Natal Province throughout the season came in fairly good condition; the fruit, however, was inclined to be coarse, as also were some of the Navels.

Transvaal Province.—Throughout the whole season the Oranges, both Navels and Seedlings from this Province, with the exception of two or three experimental consignments from the Warmbaths Experimental Station, suffered very seriously, the condition of the fruit on more than one occasion being deplorable. The waste was principally noticeable in certain marks of prominent shippers, whose fruit during previous seasons very deservedly established a high reputation for excellence. It was, therefore, a matter of great concern to those interested in the handling of this fruit when the shipments commenced to arrive in an extremely unsatisfactory condition. I am fully aware that the conditions under which the fruit was carried this year, cannot be compared with those prevailing during 1914. A good deal of the fruit was coarse-skinned, badly "marked," "scored," and ill-shaped, and no inconsiderable portion could with advantage have been excluded from shipment. The condition of the fruit ex the S.S. "Marathon" and S.S. "Gaika," for example, was pitiful in the extreme. Some of the boxes contained nothing but a mass of pulp, and but for the fact that the London Agents repacked practically the whole of the consignment on arrival here, the growers would doubtless have suffered considerable loss.

It is only right to say that in some cases Oranges arriving from other parts of the Rustenburg district reached the market in very good condition.

The fruit from the Barberton and Marico districts arrived fairly satisfactorily, but these Oranges are somewhat coarse-skinned. It may be that they are the product of new trees, in which case they will probably improve as time goes on. I should like to point out, however, that there are several growers in these districts who might very materially improve the packing of their fruit. Too many "slack" cases were noticeable.

"Valencia Late" and "du Roi" Varieties.—Towards the end of September a fairly large number of cases of "Valencia Lates" and "du Roi" varieties arrived. These Oranges are evidently a hardier fruit than the ordinary Seedling, and consequently carried better in Ventilated Hold than the main crop, but even these showed a certain amount of waste. The receivers describe these Oranges as a good and saleable Orange.

Government Consignments.—Four experimental consignments were received during the season from the Warmbaths Experimental Station, Transvaal.

The first lot *ex* "Balmoral Castle" consisted of 88 cases of Seedling Oranges and these opened up in excellent condition, the fruits being well graded, sized, and packed. These were amongst the best packed fruit of the season, a fact to which they owed no little of their immunity from waste. The 176's and 252's were nice, firm, thin skinned fruit, but the shorter counts, 96's to 112's, *i.e*, the larger fruits, were coarse in appearance.

These Oranges the salesman informed me, compared favourably with those grown in the Cape Province, both as to colour and juiciness. In fact, if anything, they had a richer and brighter appearance. 14s. to 18s. a case was realised for this particular consignment.

The second parcel, *ex* "Kenilworth Castle" consisted of 114 cases of Navels, in two varieties, *i.e.*, "Thomsons" and "Washingtons." The condition of the fruit on arrival was excellent and showed very little waste. The good carrying qualities of these oranges were proved by the fact that there was found to be no appreciable difference between the those carried in Cool Chamber, and those on deck. Amongst salesmen, however, the quality of the fruit was not considered of the highest class. The fruit, moreover, varied very considerably. Some were much finer than others. The colour and size generally were satisfactory. This consignment realised from 16s. to 18s. a case.

The third consignment, *ex* "Gaika," consisting of 93 cases of Oranges ("Valencia Lates") and 11 cases Grape Fruit did not turn out quite so satisfactorily as the previous shipments. The fruit was carried as ordinary cargo and arrived in a rather dry and soft condition. The larger Oranges, 96's, 112's and 126's, were of coarse appearance with thick skins, but the smaller fruits were somewhat better.

The grape fruit consisted of rather poor specimens, the skins being from $\frac{1}{2}$ to $\frac{3}{4}$ inches thick, and in some instances the fleshy part was rather dry. The weight of one of the fruits when compared with a Jamaican fruit of similar size showed as much difference as 5 ounces. This is bound to seriously affect the selling qualities of our fruit.

The Oranges in the third consignment realised from 11s. to 17s. a case, and the Grape Fruit 14s. a case.

The fourth and final shipment, *ex* "Llandovery Castle," consisted of 100 cases. This arrived in splendid condition and showed practically no waste, Prices secured were most satisfactory, ranging from 15s. to 20s. a case.

In so far as the keeping qualities of these Oranges are concerned, I should add that a case from each of these four separate consignments was placed in this Department's Show Window, and in nearly every case the fruit held up extremely well for several weeks.

Prices.—As regards prices, these ruled about the same as during the previous season, except for Navel Oranges, which, on this occasion, only secured slightly higher prices than Seedlings. The reason for the somewhat lower prices for Navels is attributed to the depressed state of the West End Retail Fruit Trade, which before the war bought a large proportion of the bigger fruit. This season, the 175 to 200 counts of Navels have experienced a better demand than formerly, this size fruit and the ordinary Seedlings being the more popular.

Prices have, of course, been seriously affected at certain times by the condition of the fruit, and it has been most noticeable that when consignments arrived in cool chamber and the fruit opened up bright and firm with a minimum of waste, upwards of 2s. to 3s. per case more was realised. Generally speaking there has never been a season since the South African Citrus fruit export commenced that prices would have been good for much larger quantities than have ever been sold in previous years if the fruit had only arrived in good condition.

About the middle of October large shipments of Jamaica oranges commenced to arrive in very good condition, whilst those from the Union were wasty and unreliable. The consequence was that prices fell by at least 1s. a case. Later on as our fruit improved and with the arrival of the later varieties, prices tended upwards, notwithstanding the competition.

The following were the approximate average prices ruling during the season:—

	Seedlings.	Navels.
June	8/– to 10/–; 11/– to 12/–	15/– to 18/–
July	9/– to 11/–; 12/– to 15/–	12/– to 15/–; 16/– to 18/–
August ..	13/– to 16/–; 15/– to 18/–	15/– to 18/–; 18/– to 20/–
September ..	14/– to 16/–; 18/– to 20/–	16/– to 20/–
October ..	8/6 to 12/–; 12/– to 14/–; 15/– to 16/6	15/– to 18/–
November ..	10/– to 12/–; 12/– to 16/6	

Handling at London Docks.—A very unfortunate feature of this season's consignments was the large number of broken and pilfered cases which reached the market. A good deal of this damage was attributed to careless handling at the Docks, but after personal investigation I am satisfied that the fault did not altogether lie here. A certain amount of rough and ready handling is inevitable at the Docks, but not more than well packed and good stout cases ought to be able to stand. The principal reasons for the breakages are, probably, the use of thinner wood in the construction of the cases and the absence of a supporting band of hoop iron round the centre of the box to prevent bursting. I have already reported that it is the general opinion amongst salesmen here that planks of not less than a full quarter of an inch should be used in connection with our fruit cases.

NAARTJES.

The bulk of this fruit reached the market in a fairly satisfactory condition, but on more than one occasion the Naartjes from the Natal Province, both in trays and boxes, showed an excessive amount of waste. The fruit from the Cape Province on the other hand opened up very well indeed and throughout the season maintained a high standard of excellence.

The packing and "get up" of the trays from both the Natal and Cape Provinces were, on the whole, satisfactory, although on one or two occasions adverse comment had to be made on the class of box used by certain of the Natal packers. From the very nature of this fruit the more attractive and dainty the trays can be made to appear the better chance will they have of a good market.

Several small parcels of this fruit arrived from the Barberton district of the Transvaal. These came in satisfactory condition and are well spoken of by the salesmen.

Prices.—As is usually the case with this fruit, the first two or three small consignments realised fairly high prices, viz., 3s. to 4s. a tray (counts of 30's to 35's), and 8s. to 10s. per box (counts of 150's, etc.). Later in the season prices somewhat receded.

The average prices throughout the season may approximately be given as:—

Natal Naartjes, in trays (Counts 28's to 32's) ..	1/6 to 2/3.
,, ,, in boxes (Counts 150's to 216's) ..	4/6 to 5/– & up to 7/–
Cape Naartjes, single layer boxes or trays	1/9 to 2/6.
,, ,, double layer boxes or trays	3/– to 4/6 & up to 5/–
Transvaal Naartjes, in trays (Counts 28's to 32's) ..	2/– to 2/3.
,, ,, in boxes (Counts 60's)	3/6 to 4/–.

LEMONS.

This season 1,054 cases of Lemons reached the London market from the three Provinces of the Cape, Natal and Transvaal. The condition of the fruit was, on the whole, satisfactory. Unfortunately the fruit, in nearly every instance was too small, the counts ranging from as many as 336's to 448's. Salesmen here are of opinion that unless South Africa can produce and send to this market better and bigger sized Lemons than represented by those received this season, they cannot hope to compete successfully with those shipped from Italy and Spain, which reach this market practically all the year round.

The smallest size Lemons which, in the opinion of the trade, would pay the South African grower to ship, would be about a 200 count, packed in the standard sized orange box.

The prices realised this season for South African Lemons were rather low, ranging from 6s. to 10s. a case.

GRAPE FRUIT.

The Grape Fruit arriving at this market consisted of 246 cases, the greater portion of which came from the Transvaal Province. The condition on arrival was very good indeed, and the fruit was well received by the trade.

The chief fault of the South African Grape Fruit is that it is too light in weight, and the skin too thick and spongy. These defects are nearly always in evidence when fruit comes from a new orchard, but as the trees get older the fruit improves in quality. The flavour of the South African article is considered to be quite satisfactory.

There is a fairly good market for this class of fruit, and the only competition to be feared is from Jamaica, from which country small supplies commence to arrive about the end of August, increasing as the season progresses.

This year as much as 25s. a case has been realised for South African Grape Fruit, but the market, under present circumstances, is somewhat limited at these prices, and very much larger supplies would, in all probability, bring down prices. In normal times a wider market can reasonably be anticipated.

PINEAPPLES.

The quantity of Pineapples received during the season under review totalled only 349 cases. The first parcel of Natal Queen Pines appeared on arrival to have carried quite satisfactorily, but after a brief exposure turned dull and presented a sodden appearance. A greenish mould or mildew was also noticeable on the outside of the fruit. Some salesmen attributed this deterioration to the extreme heat prevailing at the time (June) immediately following the removal of the fruit from the cool chamber. This collapse so soon after arrival is all the more remarkable, in view of the fact that previous shipments had all turned out satisfactorily. During this year's (1915) Deciduous Season 1,300 boxes were received from the Cape and Natal Provinces, and the condition and appearance of the fruit was all that could be desired.

The parcels of Queen Pines which followed the one referred to above showed a certain amount of improvement, but prices were rather low, and ranged from 3s. to 5s. a case of 12's and 7s. to 9s. for 32's.

It might interest pineapple shippers to learn that for some time past the Covent Garden market has received very large supplies of Azores Pines, and prices have ranged ridiculously low. Before the war anything from 2s. 6d. to 5s. a pine could be obtained, but to-day a good sized fruit can be bought for as low as 1s., the reason being that Azores shippers cannot export to Germany where in normal times the greater portion of these pines are sent. There would, in all probability be an improving demand for South African Pineapples providing they could be sold here at from 3s. 6d. to 4s. per dozen, which prices would enable the retailers to sell them at 6d. each.

(Signed) A. CANHAM,

Acting Trades Commissioner.

APPENDIX XX.

STATEMENT OF IMPORTS.

1. Return showing quantity and value of Importations from Oversea of certain Agricultural Produce and Articles used for Agricultural Purposes during the Calendar years 1914 and 1915.

Produce or Article.	1914.		1915.	
	Value.	Quantity.	Value.	Quantity.
	£		£	
Beans & Peas	29,111	6,235,611 lbs.	33,569	6,116,926 lbs.
Dholl	25,684	5,346,045 ,,	28,096	5,441,277 ,,
Flour, Wheat & Wheaten Meal	607,796	134,189,649 ,,	455,421	71,680,229 ,,
Maize	188	48,746 ,,	118	17,502 ,,
Malt	65,220	9,614,121 ,,	54,920	7,781,269 ,,
Oats	2,646	741,133 ,,	117	38,374 ,,
Wheat	765,723	226,917,289 ,,	989,079	216,665,646 ,,
Oatmeal	57,079	6,404,377 ,,	64,224	5,791,031 ,,
Fruit, Fresh, including Nuts	37,959	488,799* ,,	36,701	679,195* ,,
Fruit, Dried, Preserved & Dates	55,817	4,034,746 ,,	70,688	5,204,388 ,,
Rice	336,166	71,660.599 ,,	394,010	81,645,421 ,,
Sugar & Sugar Products	347,557	56,107,147 ,,	181,448	24,282,101 ,,
Butter & Butter Substitutes	249,213	5,692,061 ,,	187,790	4,121,587 ,,
Cheese	157,405	5,223,283 ,,	155,466	3,966,269 ,,
Milk, Condensed	434,978	20,954,936 ,,	410,433	19,262,667 ,,
Eggs, Fresh	59,314	(Not available)	19,233	525,351 ,,
Hams, Bacon & Salted Meats	231,609	5,628,258 lbs.	213,881	4,611,778 ,,
Lard & Lard Substitutes	53,819	2,190,195 ,,	60,682	2,359,139 ,,
Beef	10,960	737,950 ,,	365	16,957 ,,
Mutton	11,065	781,675 ,,	238	8,881 ,,
Poultry	5,773	153,694 ,,	2,329	57,768 ,,
Game	1,411	46,644 ,,	568	10,508 ,,
Meats, Tinned & Preserved	118,495	2,852,492 ,,	134,687	2,660,660 ,,
Potatoes	13,056	3,713,522 ,,	9,358	2,577,926 ,,
Biscuits and Cakes	63,838	2,215,072 ,,	62,894	1,817,526 ,,
Confectionery, Jams & Jellies	255,967	6,837,915 ,,	333,208	7,849,200 ,,
Fish, Fresh, Dried & Preserved	217,553	8,757,138 ,,	265,296	9,216,288 ,,
Pickles, Sauces, Condiments (including Spices & Tumeric)	83,536	2,818,021 ,,	94.072	3,002,150 ,,
Hops	30,571	3,856 cwts.	18,679	3,989 cwts.
Tobacco (Unmanufactured)	50,299	924,240 lbs.	29,910	564,079 lbs.
Tobacco (Cigars, Cigarettes & other Manufactures)	115,987	401,932 ,,	79,116	249,164 ,,
Brandy	55,403	65,869 galls.	60,618	74,652 galls.
Wines	46,394	62,766 ,,	51,428	70,761 ,,
Total	£4,597,592		£4,498,642	

* Weight of Nuts only.

2. Return showing the value of Importations from Oversea and consumption of certain Agricultural Produce and Articles used for Agricultural Purposes during the Calendar years 1914 and 1915.

Produce or Article.	1914.		1915	
	Imported.	Consumed.	Imported.	Consumed.
	£	£	£	£
Beans & Peas	29,111	30,349	33,569	32,020
Dholl	25,684	24,813	28,096	26,993
Flour, Wheat & Wheaten Meal	607,796	576,281	455,421	462,455
Maize	188	443	118	118
Malt	65,220	64,671	54,920	54,388
Oats	2,646	2,453	117	184
Wheat	765,723	734,461	989,079	898,449
Oatmeal	57,079	54,591	64,224	62,542
Fruit, Fresh, including Nuts	37,959	36,843	36,701	34,869
Fruit, Dried, Preserved, & Dates	55,817	53,368	70,688	67,835
Rice	336,166	344,098	394,010	388,796
Sugar & Sugar Products	347,557	353,494	181,448	177,311
Butter & Butter Substitutes	249,213	251,500	187,790	173,538
Cheese	157,405	145,578	155,466	147,922
Milk, Condensed	434,978	409,028	410,433	409,466
Eggs, Fresh	59,314	56,339	19,233	18,905
Hams, Bacon & Salted Meats	231,609	215,044	213,881	198,944
Lard and Lard Substitutes	53,819	51,693	60,682	57,685
Beef	10,960	13,700	365	499
Mutton	11,065	2,093	238	229
Poultry	5,773	5,841	2,329	2,203
Game	1,411	1,069	568	591
Meats, Tinned & Preserved	118,495	103,613	134,687	89,134
Potatoes	13,056	12,362	9,358	7,688
Biscuits and Cakes	63,838	59,625	62,894	58,790
Confectionery, Jams & Jellies	255,967	257,437	333,208	325,605
Fish, Fresh, Dried & Preserved	217,553	211,697	265,296	247,546
Pickles, Sauces, Condiments (including Spices & Tumeric)	83,536	80,014	94,072	91,184
Hops	30,571	30,309	18,679	18,248
Tobacco (unmanufactured)	50,299	48,801	29,910	34,191
Tobacco (Cigars, Cigarettes & other Manufactures)	115,987	101,153	79,116	70,429
Brandy	55,403	51,516	60,618	52,848
Wines	46,394	41,765	51,428	42,811
Total	4,597,592	4,426,042	4,498,642	4,254,416
Agricultural Machinery	101,052	98,445	75,348	75,257
Agricultural Implements	364,522	352,484	259,924	253,624
Manures & Fertilisers	180,892	179,987	175,336	174,164
Seeds	25,119	24,071	18,819	18,134
Sheep Dip	44,231	47,542	67,781	68,121
Water Boring Machinery	19,570	15,651	4,074	2,456
Fencing Material, Wire, Standards, &c.	356,621	352,996	112,843	110,946
Binding Twine & Harvest Yarn	22,457	22,297	17.136	17,033
Cement	69,009	69,385	42,199	35,454
Saddlery & Harness	41,716	41,332	6,796	6,241
Windmills	68,761	67,810	34,599	34,300
Timber & Wood (unmanufactured)	679,522	691,387	442,136	480,517
Total	1,973,472	1,963,387	1,256,991	1.276,247

3. Fertilisers imported into the Union during the Calendar years 1914 and 1915.

Name.	1914.		1915.	
	Quantity.	Value.	Quantity.	Value.
	Tons (2,000 lbs.)	£	Tons (2,000 lbs.)	£
Basic Slag	6,832	13,786	9,027	21,029
Bone Manure	4,400	18,293	2,019	8,776
Guano	1,128	4,967	726	2,849
Nitrate of Soda	25	227	—	—
Phosphates (Raw)	377	1,185	—	—
Potash Manures	713	6,181	31	672
Sulphate of Ammonia	231	2,408	67	788
Superphosphates	36,836	88,103	33,911	110,143
All other N.O.D.	9,105	45,742	6,548	31,079
	59,647	180,892	52,329	175,336

APPENDIX XXI.

AGRICULTURAL PRODUCE EXPORTED OVERSEA.

STATEMENT SHOWING VALUE AND QUANTITIES OF
FROM THE UNION OF SOUTH AFRICA during the Calendar years 1914 and 1915.

Produce or Article.		1914.		1915.	
		Quantity.	Value.	Quantity.	Value.
			£		£
Animals, Living	..	—	33,568	—	44,465
Bark	lbs.	130,216,826	286,399	89,661,464	195,244
Buchu Leaves	,,	149,113	27,558	157,061	23,767
Maize	,,	220,031,205	438,455	298,765,234	631,646
All other Corn, Grain Meal, Fodder & Forage	,,	38,700,089	94,337	57,322,771	154,202
Ostrich Feathers	,,	755,325	1,342,717	948,945	743,772
Fruit, Fresh (including Nuts) ..	,,	— .	94,245	—	63,967
Hair, Angora	,,	18,865,743	834,202	16,304,378	687,635
Hides and Skins	..	—	1,572,258	—	1,675,794
Horns	..	—	8,924	—	5,695
Meats	lbs.	640,353	15,104	6,412,037	118,132
Sugar, Molasses & Treacle ..	,,	12,651,922	16,482	13,517,343	49,787
Tobacco	,,	235,058	18,659	614,533	36,304
Tobacconist Wares (Calabashes) ..	No.	731,522	6,830	320	40
Wines	galls.	48,492	9,627	82,564	20,952
Wool, Sheep	lbs.	133,981,317	4,238,205	170,003,173	5,380,031
Total	..		£9,037,570		£9,831,433

APPENDIX XXII.

CROP REPORTS.

FACSIMILES OF CARDS SENT TO CROP CORRESPONDENTS.

Note.—The reverse of each card bears the printed address "On His Majesty's Service Secretary for Agriculture, Pretoria," and is thus ready for posting without postage.

7457-20/11/16—10,000. Month—*Maand*........................ **Card No. 1. Kaart No. 1.**

1916-17.

CROP REPORT.—OOGSTVERSLAG.

The correspondent is requested kindly to fill in the following particulars **on the last day of the above-mentioned month** and then to post this card (already addressed) :—

Korrespondent wordt verzocht, zo goed te willen zijn, de volgende biezonderheden **op de laatste dag van bovengenoemde maand** *in te vullen en dan deze (reeds geadresseerde) kaart te posten :—*

District—*Distrikt*........................ Post Office—*Postkantoor*...................

	Wheat. *Koren.*	Oats. *Haver.*	Barley. *Garst.*	Maize. *Mielies.*	Kaffir Corn. *Kafferkoren.*	Tobacco. *Tabak.*	Lucerne. *Lucerne.*	Sugar Cane. *Suikerriet.*
Estimated area under crop more (or less) than last year in your locality.* *Geschatte oppervlakte onder verbouwing meer (of minder) dan verleden jaar in uw buurt.**								

Weather conditions at time of sowing (state whether favourable or unfavourable)........................

Weersgesteldheid ten tijde van 't zaaien (te luiden gunstig of ongunstig)

State whether sowing took place at usual time of year, or earlier than usual, or later than usual...................

Vermeld of op de gewone tijd gezaaid werd, dan wel vroeger of later dan gewoonlik

Correspondent's signature—*Handtekening van Korrespondent*...................

*** If estimated area sown is the same as last year, fill in the number 1 0 0 in each column ; if 5 per cent. more, fill in 1 0 5 (that is, 100 + 5) ; if 10 per cent. more, fill in 1 1 0 ; if 5 per cent. less, fill in 9 5 (that is, 100 — 5) ; if 20 per cent. less, fill in 8 0, etc.**

*** Wordt de oppervlakte onder verbouwing geschat op evenveel als verleden jaar, vul dan het getal 1 0 0 in elke kolom in ; op 5 percent meer, dan 1 0 5 (d.w.z. 100 + 5) ; op 10 percent meer, 1 1 0 ; op 5 percent minder, 9 5 (d.w.z. 100 — 5) ; op 20 percent minder, 8 0 ; enz.**

Card No. 1, Supplementary. Kaart No. 1, Aanvullend.

Month—*Maand*........................

CROP REPORT.—OOGSTVERSLAG.

In addition to the information on Card No. 1, forwarded herewith, the correspondent is requested also kindly to furnish, **at the same time,** the following information :—

Behalve de inlichting op hierbijgaande Kaart No. 1, wordt korrespondent vriendelik verzocht, **tevens** *de volgende inlichting te verstrekken :—*

District—*Distrikt*........................ Post Office—*Postkantoor*...................

REASONS WHY THERE IS INCREASE OR DECREASE IN THE AREA SOWN.
REDENEN WAAROM ER EEN VERMEERDERING OF VERMINDERING IN DE OPPERVLAKTE ONDER VERBOUWING IS.

(State opposite the name of each crop whether increase or decrease due to favourable season or insufficient rain, or shortage of labour, or whatever other cause.

(Vermeld tegenover de naam van elk gewas of de vermeerdering of vermindering het gevolg is van gunstig weer onvoldoende regen of ontoereikende arbeidskrachten, of van welke andere oorzaak ook.)

Wheat—*Koren*...

Oats—*Haver*...

Barley—*Garst*...

Maize—*Mielies*...

Kaffir Corn—*Kafferkoren*...

Tobacco—*Tabak*...

Lucerne—*Lucerne*...

Sugar Cane—*Suikerriet*...

Correspondent's Signature—*Handtekening van Korrespondent*...................

6218—5/10/16—2,000

3981—29/6/16—13,000 Month—*Maand*........................ **Card No. 2. Kaart No. 2.**

1916-17.

CROP REPORT.—OOGSTVERSLAG.

The correspondent is requested kindly to fill in the following particulars **on the last day of the above-mentioned month,** and then to post this card (already addressed):—

Korrespondent wordt verzocht, zo goed te willen zijn, de volgende biezonderheden ***op de laatste dag van bovengenoemde maand*** *in te vullen en dan deze (reeds geadresseerde) kaart te posten* :—

District—*Distrikt*...................... Post Office—*Postkantoor*..................

	Wheat. *Koren.*	Oats. *Haver.*	Barley. *Garst.*	Maize. *Mielies.*	Kaffir Corn. *Kafferkoren.*	Tobacco. *Tabak.*	Lucerne. *Lucerne.*	Sugar Cane. *Suikerriet.*	
Condition of Crop* *Toestand van Gewas**									

Weather conditions during the month (state whether excessive rains, or favourable rains, or drought, or hailstorms, or destructive wind, or severe frost, etc.).

Weersgesteldheid gedurende de maand (te luiden bovenmatige regens, gunstige regens, droogte, hagelstormen, vernielende wind of zware rijp, enz.). ....

State any insect pest, or rust, or other disease causing unusual loss..............................

Vermeld insekteplaag, roest of andere ziekte, bovenmatig verlies veroorzakende.

Correspondent's Signature—*Handtekening van Korrespondent*..............................

*** If the condition is such that an ordinary full yield is expected, place the number 100 in the column concerned; if the condition is so exceptionally good that, say, 15 per cent. more than an ordinary full yield is expected, insert the number 115 (that is, 100 + 15); if, say, 10 per cent. less than an ordinary full yield is expected, insert 90 (that is, 100 — 10), etc.**

*** Is de toestand zodanig, dat een gewone, volle opbrengst verwacht wordt, zet dan het getal 100 in de betreffende kolom; is de toestand zo buitengewoon goed, dat, zegge, 15 percent meer dan een gewone, volle opbrengst verwacht wordt, vul dan 115 (d.w.z. 100 + 15) in; wordt, zegge, 10 percent minder dan een gewone, volle opbrengst verwacht, dan 90 (d.w.z. 100 — 10), enz.**

3982—29/6/16—5,000. ***Card No. 3. Kaart No. 3.***

Month—*Maand*.......................

1916-17.

CROP REPORT.—OOGSTVERSLAG.

The correspondent is requested kindly to fill in the following particulars **on the last day of the above-mentioned month** and then to post this card (already addressed):—

Korrespondent wordt verzocht, zo goed te willen zijn, de volgende biezonderheden ***op de laatste dag van bovengenoemde maand*** *in te vullen en dan deze (reeds geadresseerde) kaart te posten* :—

District—*Distrikt*...................... Post Office—*Postkantoor*..................

	Grapes. *Druiven.*	Pears. *Peren.*	Plums. *Pruimen.*	Apricots. *Abrikozen.*	Peaches and Nectarines. *Perziken en Nektarinen.*	Apples. *Appels.*	Pineapples. *Pijnappels.*	Oranges and Naartjes. *Zoetlimoenen en Nartjes.*	
Condition of Crop* *Toestand van gewas**									

Weather conditions during the month (state whether excessive rains, or favourable weather, or drought, or excessive cold or heat, or hailstorms, or destructive wind, or severe frost, etc.) ....

Weersgesteldheid gedurende de maand (te luiden : bovenmatige regens, gunstig weer, droogte, bovenmatige koude of warmte, hagelstormen, vernielende wind of zware rijp, enz.)

State any insect pest or disease causing unusual loss..............................

Vermeld insekteplaag, roest of andere ziekte, bovenmatig verlies veroorzakende

Correspondent's signature—*Handtekening van Korrespondent*..............................

*** If the condition is such that a very good yield is expected, place the figure 100 in the column concerned; if a good crop is expected insert the figure 90; if a fair yield is expected, insert 80; if a poor yield is expected, insert 70; if the yield is bad, insert 60; if the crop is a failure, or nearly so, insert 50.**

*** Is de toestand zodanig, dat een zeer goede oogst verwacht wordt, zet dan het getal 100 in de betreffende kolom; wordt een goede oogst verwacht, vul dan het getal 90 in; een redelike oogst, dan 80; een slechte oogst, 70; een zeer slechte oogst, 60; en is de oogst een mislukking, of nagenoeg een mislukking, dan 50.**

3983—29/616/—6000. ***Card No. 4. Kaart No. 4.***

Month—*Maand*.......................

ISSUED TO SHEEP INSPECTORS AND STOCK INSPECTORS ONLY.
ALLEEN VOOR SCHAPE- EN VEEINSPEKTEURS BESTEMD.

LIVE STOCK REPORT.—LEVENDE-HAVE-VERSLAG.

The correspondent is requested kindly to fill in the following particulars **on the last day of the month above mentioned** and then to post this card (already addressed):—

Korrespondent wordt verzocht, zo goed te willen zijn, de volgende biezonderheden ***op de laatste dag van bovengenoemde maand*** *in te vullen, en dan deze (reeds geadresseerde) kaart te posten* :—

District—*Distrikt*...................... Post Office—*Postkantoor*..................

Condition of Live Stock (state whether fat, or good, or medium or poor)..............................

Konditie van Levende Have (te luiden vet, goed, middelmatig of slecht)

Signature—*Handtekening*..............................

APPENDIX XXIII.

WEATHER CONDITIONS.

A brief report reviewing weather conditions in the Union during the period of this report has been supplied by Mr. Stewart, of the Meteorological Branch, Department of Irrigation, and is subjoined:—

"During the three months preceding the period under review, good rains fell over Swaziland, the north-east of the Orange Free State, and most parts of the Transvaal. In the north of the latter Province the normal was exceeded by about eleven inches, while in the centre, west and east excesses varying from six to four inches were recorded. In the extreme south-western districts of the Transvaal, however, in common with the remainder of the Union there was a deficit.

"In the north of the Transvaal temperatures were higher than usual during April; but in May they fell considerably. In June there was a movement towards more normal conditions, and in July, although a few severe frosts followed the rains, the mean air temperature was almost normal; and for the next six months it remained so. February and March, more especially February, were months of abnormal heat. The rainfall in April was almost negligible; less in fact than in May and June when little is expected. July, however, proved exceptional in the opposite sense, much rain falling over Swaziland; the extreme east, north-east and centre of the Orange Free State; and the Transvaal (excepting the extreme south-western districts). These rains brought the cumulative rainfall over the northern Transvaal (from April 1st) above the average. The following rainy season began well; but in November there was a set back, precipitation being much less than the normal, and in many cases taking the form of hail. The conditions were worse in December and January, and again worse in February. Although the rainfall of March was normal, the twelve months closed with a deficit of 35 per cent. of the normal annual rainfall. In the western Transvaal, the conditions were somewhat similar although less intense, the shortage for the whole period amounting to 18 per cent. The frosts following the July rains were also less severe; but, on the other hand, destructive hailstorms occurred in October and November. In the centre and east the failure of the rains commenced in January, and the total deficit was only 14 per cent.; temperatures were much the same as in the north. Snow fell in some parts in July. In the south-western districts there was an almost unbroken sequence of shortages in the monthly rainfall. In February the deficit was most pronounced, and at the same time the temperature, which had previously shown no remarkable traits, rose considerably above the normal. In the following month there was little improvement, and the year ended with a shortage of 45 per cent. in the rainfall.

"The Swaziland temperatures were relatively low in September and December, and high in February, there being little deviation from the normal in other months of the period. Good rains occurred in October, November, and December, and although there was a falling off in January and February, it was by no means serious, and the year might be considered a normal one. The same might be said of Natal, the only noteworthy feature of the rainfall occurring inland, where there was a shortage in January, balanced by an excess in February. The air was colder than usual during July, December, and January.

"Over the Orange Free State, temperatures exhibited a tendency towards the subnormal, the greatest departures in this direction being in July, when snow fell in the east and north-west, December and January. August was rather warmer than usual, as also was February in the centre of the Province. In April there was scarcely any rain; but the following season opened well, despite strong cold winds and a few frosts causing damage in September, and the rains of October brought the cumulative fall up to normal in the north-east, centre and west. In the north-east precipitation during the next five months was very satisfactory, and the year closed with an excess of 13 per cent. Over the centre, conditions continued satisfactory until February, when the rains failed. In the following month there was an improvement, although the normal was not reached, and the twelve months ended with a deficit of about 18 per cent. In the west shortages continued during the last five months, and the yearly total was only 58 per cent. of the normal. The normal cumulative amount was reached in November in the north-west of the Province, and in December in the east; but in both parts a relatively dry February resulted in a shortage of 13 per cent. for the period.

"Over the northern borders of the Cape Province, very little rain fell in April and May. The following rainy season commenced well, and December exceeded the average; but during the whole of November, January, and February, not an inch fell. In March there was a slight improvement, but the total rainfall was not much more than a third of the normal, and the period closed with a shortage of about 45 per cent. On the Karoo an even more serious state of affairs existed; the total shortage was about the same, but the rains failed at the beginning of the season. Only in December and March was the rainfall normal.

"In the north-east temperatures were higher than usual in August, September, and February, almost normal during December and January, and lower during the remainder of the year. In April not half the usual quantity of rain fell; but in the following season normal conditions prevailed until December, when the rains failed. A recovery during January was followed by an exceedingly dry February, and as March contributed only 73 per cent. of its usual quantity to the total, there was a deficit of 36 per cent. at the end of the period. Over the south-east temperatures varied in the same manner as in the north-east, except that they were well above normal in November, and only slightly above in February. The rainfall was generally more satisfactory, and although each month showed a deficit it was only slight until February, when precipitation fell to only 20 per cent. of the average. There was a good recovery in March, however, and the whole year showed a deficit of about 21 per cent.

"On the Cape Peninsula temperatures were much below normal in April and July; in May and June they were above. August was normal, from when it was hotter than usual until March. The rainfall was satisfactory in April, and although May was dry, a good month in June brought the cumulative rainfall for the three months to the normal. In July and September the rains were again good, and although August and October showed deficits the rainfall for the year was 95 per cent. of the normal. In the south-west districts conditions were very similar, except that August and October were better months, and the year's rainfall consequently exceeded the normal by about 7 per cent. In November and December gales caused a considerable amount of damage.

"Along the south coast temperature conditions were fairly normal throughout the period, excepting that July was much cooler than usual. A slight shortage in the February rainfall was more than compensated for in July and January, and the year's total revealed an excess of about 37 per cent. On the west coast temperatures were more erratic, being very low in July and September, and high in October and November. The rainfall was very similar in character to that of the south-western districts, and in quantity exceeded the normal by 37 per cent.

APPENDIX XXIV.

PRODUCE MARKET RATES.

The following table gives the prices obtained for certain classes of produce during the year 1915 on the Johannesburg Municipal Market. These rates being obtainable on the largest market of its kind in the Union, will give an indication of the ruling rates generally during the year for the class of produce affected. It must be borne in mind, however, that the quality of the commodities enumerated cannot in all cases be taken as being the best, for in several instances, such as maize, the higher grade produce is sold through other channels and at higher rates. In this connection, also, it may be mentioned that very high prices, ranging from 1s. 1d. to 1s. 10d. per lb. were paid for butter fat during the year, and though these prices were exceptional, and due to abnormal trade conditions, the prices obtained for butter on the Johannesburg market cannot be taken as reflecting the prices obtained for the best creamery butter.

PRODUCE MARKET RATES, 1915, JOHANNESBURG MUNICIPAL MARKET.

Commodity.	Per	Maximum.		Minimum.		Average Price for year 1915.
		Month.	Rate.	Month.	Rate.	
Barley	Bag, 150 lbs. net	July	11/3	Nov.	9/6	10/8
Butter	Lb.	July to Oct.	1/6	Jan.	9d.	1/3
Eggs, Fresh	Dozen	May	1/9	Jan.	10d.	1/1
Kaffir Corn	Bag, 200 lbs. net	Jan.	11/–	Sep. & Oct.	6/9	8/4
Lucerne, Green	100 bundles	March	6/9	Jan., Aug. & Sept.	3/6	5/–
,, Dry	100 lbs.	May & July	5/3	Jan.	3/9	4/5
Manna	100 lbs.	Jan., July & Dec.	4/–	Feb.	2/9	3/5
Mealies, Yellow	Bag, 200 lbs. net	Feb.	13/3	Sept.	7/7	10/1
,, White	,, ,,	Feb.	12/6	Sept.	7/1	9/2
Oathay	100 lbs.	May	6/3	Sept.	4/3	5/1
Oats	Bag, 150 lbs.	Jan.	13/6	Sept.	10/–	11/–
Potatoes	Bag, 150 lbs. net. Best.	Oct.	19/–	Feb.	5/–	10/6
Teff Grass	100 lbs.	Jan.	4/–	Sept.	2/3	2/6
Wheat	Bag, 200 lbs.	Sept.	28/9	July & Nov.	24/–	26/–
Livestock.						
Cattle	Head	£28 5 0				£10 15 0
Sheep	,,	£2 12 6				15/– to 25/–
Meat—Beef	Lb.	—	—	—	—	2¼d. to 4¾d.
Mutton	Lb.	—	—	—	—	5d. to 7d.

	Price. s.	d.
Education Pamphlets—(*Continued*):		
17. Education Office Library Catalogue 1902	0	6
18. School Libraries		
20. School Board Act and Regulations (English) 1912	0	9
20. Do. do. do. (Dutch) 1912	0	9
The School Board Amendment Act No. 45 1908	0	6
The School Board Amendment Act No. 25 1909	0	4
Fencing Act, No. 17, 1912 (English and Dutch)	0	6
Field-Cornet's Manual, 1904 (English)	2	0
Do. do. (Dutch)	5	3
Education Commission, Minutes of Evidence, Vol. 1-4, 1911 (English only) each	5	0
Explosive Act with Regulations, 1911	1	0
Geodetic Survey of South Africa, Vol. I., 1894	7	6
Do. Do. Vol. II., 1899	10	6
Geslacht Register der Oude Kaapsche Familiën:		
Vol. 1, A-J, ½ Cloth nett	7	6
Do. ½ Calf	14	0
Vol, 2, A-O, ½ Cloth nett	7	6
Do. Cloth	11	6
Do. ½ Calf	17	0
Vol. 3, P-Z, ½ Cloth nett	7	6
Do. Cloth	13	9
Do. ½ Calf	20	0
1 Set Vols. 1, 2, and 3, ½ Cloth nett	21	0
Gazette, Cape Govt. Proclamations and Principal Govt. Notices, Index to, 1803—1881	6	6
Gazette, Cape Govt. Proclamations and Principal Govt. Notices, Index to, 1881—1891	4	0
Gazette, Cape Govt. Proclamations and Principal Govt. Notices, Index to, 1891—1901	6	6
Gazette, Cape Govt. Index to, to June, 1906 (½ yearly) each	1	6
Gazette, Cape Govt. Index to, July, 1906, to December, 1909 (½ yearly) each	2	6
Gazette, Cape Govt. Index to, January, 1910, to 30th May, 1910	2	6
Gazette, Union Govt. Index to, June to September, 1910 nett	5	0
Gazette, Union Govt. Index to, January, 1911, to March, 1914 nett	5	0
Gazette, Union Govt. Index to, April, 1914, to March, 1916 (Quarterly) nett	2	6
Gazette, Cape Official, Index to, June to December, 1910	1	6
Gazette, Cape Official, Index to, January to June, 1911	1	0
Gazette, Cape Official, Index to, July, 1911, to June, 1916	1	6
Griqualand West, Laws of, 1871-1880	6	6
Historical Documents (Theal), Dutch, 1896, Vols. 1 and 2 each	1	6
Historical Documents (Theal), Dutch, 1911, Vol. 3	12	6
Horse, Diseases of and their Treatment, by Dr. Hutcheon (English or Dutch)	4	0
House of Assembly, Index to Annexures and Printed Papers, 1854-97, 1898-1903 and 1904-1910 each	7	6
House of Assembly, Standing Rules and Orders of, 1912, English or Dutch, each	3	6
Insolvency, Act to Consolidate and Amend the Laws relating to, (No. 32 of 1916)	1	0
Irrigation Act with Regulations, 1912 (English and Dutch) each	3	0
Irrigation in America, 1915 (Lewis)	10	6
Justices of the Peace, Manual for the guidance of, 1891 (Tennant)	10	0
Kaffir War of 1835, Documents relating to the (Theal)	16	6
Leprosy, Handbook on, 1896 (Impey)	12	0
Liquor Laws, 1900	0	9

	Price s.	d
Marine Investigations in South Africa, Vol. I.	20	0
Do. Do. Vol. II.	26	0
Do. Do. Vol. III.	20	0
Do. Do. Vol. IV.	20	0
Do. Do. Vol. V.	10	6
Marriage Laws, 1903	1	6
Marriage Law Amendment Act No. 11 of 1906	0	4
Miners' Phthisis Commission Report of the, 1911, English or Dutch each	2	0
Miners' Phthisis Prevention Committee, General Report of the, 1916	7	6
Mines Works and Machinery Act with Regulations, 1911	2	6
Municipalities, Acts of Parliament relating to	3	6
Native Territories, Statutes, Proclamations and Government Notices in force on the 30th June, 1907 Linen covers	12	6
Do. Do. Bound, non-interleaved	16	5
Ordinances, Cape Provincial 1911	1	0
Do. do. do. 1912	2	0
Do. do. do. 1913	1	0
Do. do. do. 1914	1	0
Do. do. do. 1915	1	0
Do. do. do. 1916	1	6
Do. Natal do. 1911	3	0
Do. do. do. 1912	2	6
Do. Orange Free State Provincial, 1911	3	6
Do. do. 1912	2	6
Do. Transvaal Provincial, 1911-12	2	6
Patents: Act to Consolidate and Amend the Laws relating to the granting of Letters Patent for Inventions and for the Registration of Patents, Designs, Trade Marks and Copyright (No. 9 of 1916)	1	0
Postal Route Map, Mounted on Rollers	6	6
Do. do. Unmounted	1	0
Precious Minerals Act, No. 31, 1898	1	4
Do. Do. Amendment, No. 16, 1907	0	6
Do. Do. (Selections)	1	0
Precious Stones Act, No. 11, 1899	1	4
Do. Do. Amendment No. 27, 1907	0	5
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